



UNITED STATES NAVY Medical News Letter

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United States Navy
MEDICAL NEWS LETTER

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Policy

The U.S. Navy Medical News Letter is basically an official Medical Department publication inviting the attention of officers of the Medical Department of the Regular Navy and Naval Reserve to timely up-to-date items of official and professional interest relative to medicine, dentistry, and allied sciences. The amount of information used is only that necessary to inform adequately officers of the Medical Department of the existence and source of such information. The items used are neither intended to be, nor are they, sus-

ceptible to use by any officer as a substitute for any item or article in its original form. All readers of the News Letter are urged to obtain the original of those items of particular interest to the individual.

Change of Address

Please forward changes of address for the News Letter to: Commanding Officer, U.S. Naval Medical School, National Naval Medical Center, Bethesda, Maryland 20014, giving full name, rank, corps, and old and new addresses.

FRONT COVER: The United States Naval Hospital Chelsea, Massachusetts is the oldest Naval Hospital in continuous service having been commissioned in 1836.

In 1823 the land (115 acres) was purchased from Dr. Waron Dexter of Boston for \$18,000. It was part of a community known as "Winnisimmet" the first permanent settlement in Boston Harbor, established in 1624-25.

During the Battle of Bunker Hill, 17 June 1775 women and children gathered on the site, with its 112 foot elevation to watch the battle.

The present main building was constructed in 1915 just in time for the hospital to cope with the influenza epidemic of 1918. In World War II admissions rose from 279 in 1939 to 2700 in 1943. Among the patients was a Lieutenant John F. Kennedy, USNR, our late President of the United States, who was sent there for treatment for wounds suffered when his PT Boat was cut in half in Pacific Combat.

Chelsea Naval Hospital is a completely modern teaching hospital working in close concert with many outstanding hospitals in the Boston area. A number of Boston's leading specialists serve as consultants to insure that hospitalized personnel have the finest medical care available.

This hospital has played a pioneer's role in the development of frozen blood, whereby blood can be stored indefinitely and re-introduced to prospective recipients.

Workload data of the hospital for F.Y. 1964 was as follows: outpatient visits 108,189; admissions 7,322; discharges 7,361; immunizations 7,719; pharmacy transactions 121,511; operations 1,175 and deliveries 1,033.—Editor

The issuance of this publication approved by the Secretary of the Navy on 4 May 1964.

U.S. NAVY MEDICAL NEWS LETTER

FEATURE ARTICLE

"WHAT'S NEW IN THE TREATMENT OF THE INJURED"

THE USE OF SODIUM BICARBONATE AND THAM IN INJURED PATIENTS

Frank C. Spencer, M.D.

The Frequency of Metabolic Acidosis in Traumatic Shock

Any injury which impairs the transport of oxygen to tissues of the body quickly results in metabolic acidosis. This occurs because of the rapid development of anaerobic oxidation. Normally cells utilize oxygen as aerobic oxygenation in which the principal end-products are carbon dioxide and water. When an adequate amount of oxygen is not available, anaerobic oxidation (oxidation in the absence of oxygen) develops in which the principal end-products of metabolism are lactic and pyruvic acids. The accumulation of these acids results in metabolic acidosis.

It is important to realize that any type of serious injury which impairs respiration or circulation will result in metabolic acidosis. The causes are numerous. Pulmonary causes include airway obstruction, pulmonary disease, pulmonary trauma, crushing injuries of the chest, or any disorder which impairs ventilation. Circulatory factors include hypotension from the loss of blood, fluid depletion, septic shock, myocardial injury, or any other condition causing hypotension. In many injured patients more than one of these factors are present.

Normally the buffer systems of the blood maintain the pH of venous blood in a narrow range of approximately 7.35 to 7.45. Mild degrees of acidosis are readily compensated for by the buffer systems; so a significant decrease in pH indicates the accumulation of a large amount of abnormal metabolic acids. As long as the pH of the venous blood remains above 7.30, few harmful physiologic affects occur. A venous blood pH in the range of 7.20-7.30, even though few clinical signs are evident, is definitely abnormal and should always be treated.

When metabolic acidosis is severe enough to depress the pH of mixed venous blood flow below 7.20, many serious physiologic disturbances rapidly occur. *Respirations*, which initially are stimulated

by the acidosis in a reflex attempt to expel carbon dioxide and lower the carbon dioxide tension (thereby compensating for the metabolic acidosis by producing hypocapnia), will become depressed. At lower levels of pH there is complete cessation of respiratory function. A frequent mode of death in such patients who initially were hyperventilating is sudden cessation of all respiratory activity, apparently from central depression of the respiratory center.

Hypotension also occurs with severe acidosis partly because catecholamines are less effective in the presence of acidosis, including both epinephrine and norepinephrine. *Consciousness* is gradually impaired, as the patient becomes increasingly drowsy. The familiar picture of diabetic coma is a classic example of depression of consciousness from metabolic acidosis. With severe acidosis *renal function* is also depressed. Finally, *cardiac function* is impaired from metabolic acidosis, resulting in further impairment of blood flow to the anoxic tissues. These cumulative effects are superimposed upon the initial injury, resulting in a rapid intensification of the metabolic acidosis with a fatal outcome unless treatment is quickly employed.

The Use of Sodium Bicarbonate

Sodium bicarbonate is usually available in 50 ml. sterile ampules, containing 3.75 gms. of sodium bicarbonate or approximately 45 milli-equivalents. Sodium bicarbonate cannot be prepared by customary techniques of heating because sodium carbonate will be formed. With severe acidosis, two ampules of sodium bicarbonate (7.50 gms. or 90 meq.) should be given intravenously within 3 to 5 minutes. This should be given directly without dilution, as there is virtually no risk from the rapid infusion of sodium bicarbonate. A good guide to the severity of acidosis if pH determinations are not available is the state of consciousness of the patient. In a seriously ill hypotensive, comatose patient, the empiric admin-

istration of 90 meq. of sodium bicarbonate is a valuable immediate form of therapy. Subsequent therapy can be rationally employed only if blood pH determinations can be done. With persistent acidosis, large amounts of bicarbonate may be required as acidosis recurs. Ten, twenty, or even thirty grams of bicarbonate may be required over a period of hours if the primary difficulty cannot be corrected. The realization that large amounts may be needed is an important concept, because therapeutic efforts are futile in the presence of a severe acidosis, which in turn profoundly depresses many vital cellular functions, including respiration, cardiac action, renal function, and vasomotor tone.

Blood pH samples should be taken from a central vein, preferably through a catheter in the superior or inferior vena cava. Lacking the presence of an indwelling catheter, samples can be obtained by direct puncture from a femoral vein. Venous samples from an extremity, where stasis may be present, may be misleading. The pH of the mixed venous blood is more significant than the pH of arterial blood, because arterial blood pH is influenced by the adequacy of respiration. The venous pH, representing the changes in the blood after perfusing the cells of the body, is a much more accurate index of the severity of metabolic acidosis.

The Use of THAM (Tris Hydroxymethyl) Amino-methane

This agent, though still classified as an investigational drug, has been widely studied in the past five years in the treatment of acidosis. It has the advantage of being a highly effective agent for neutraliza-

tion of acids *in vivo* and is free of sodium. This point, however, is probably of significance only in the treatment of patients with cardiac failure. Except for avoiding the infusion of large amounts of sodium, there is no good evidence that THAM is of any greater value in the treatment of acidosis than the infusion of sodium bicarbonate. THAM has additional metabolic effects, the most prominent being the induction of an active osmotic diuresis.

THAM is customarily infused in a .3 molar solution, (36 gm./liter), which is isotonic with blood. An average dose of THAM is 150 mg./kg. body weight. This is approximately 10.5 gm. of THAM or about 85 meq., which produces about the same acid neutralizing effect as two ampules of sodium bicarbonate. Much larger amounts of THAM are well tolerated, infusing as much as one gm./kilo. of body weight when necessary. An excellent recent publication of the use of THAM in large amounts is by Nahas, G. G., *et al* (Control of Acidosis and the Use of Titrated ACD blood in Open Heart Surgery. *Annals of Surgery* 160, 1049, 1964).

In summary, metabolic acidosis invariably occurs with severe trauma as a result of impaired transport of oxygen to the tissues. Multiple causes may be present, including impairment of ventilation, cardiac function, and hypovolemia. The prompt infusion of 90 meq. of sodium bicarbonate (two 50 ml. ampules) is a valuable initial mode of therapy in desperately ill patients, especially if pH determinations are not readily available. Further therapy is best guided by serial determinations of the pH of central venous blood. pH determinations are no more complex than measuring an hematocrit and deserve much wider utilization in resuscitation of injured patients.

REPRODUCIBILITY OF THE TECHNIC OF MAMMOGRAPHY (EGAN) FOR CANCER OF THE BREAST

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Mammography shows promise of being an important diagnostic aid in control of cancer of the breast.

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Lack of knowledge of what the technic offers tends to impede continued development and professional acceptance of mammography. For this reason the Public Health Service has collaborated with The University of Texas, M. D. Anderson Hospital and Tumor Institute, in cooperation with twenty-four

other medical institutions, // to evaluate the reproducibility of a recently reported mammographic technic by radiologists previously unfamiliar with its use. The results of this study are presented here to provide objective evidence on which to make judgments of the place of mammography in the diagnosis of cancer of the breast.

S/LUTHER L. TERRY

The twenty-year plateau in the death rate from breast cancer has persisted despite all efforts to reduce it. Surgery and radiation, with present diagnostic methods, seem to have reached their upper limits of salvage. Chemotherapy and hormones, while offering promise, do not present an immediate hope of greatly improving survival. As a result, every avenue is being explored in diagnostic and therapeutic research to increase the survival rate of patients with breast cancer. Mammography, as reported in recent literature, appears to offer potential as a diagnostic aid in identifying cancer of the breast in its early stages, and may detect occult lesions that cannot be detected by other means. This paper is basically concerned with the degree to which one promising technic of mammography can be reproduced by radiologists not previously familiar with its use.

Mammography is the roentgenographic examination of the breast. In its present usage, no contrast medium which could obscure the pathologic condition is injected into the ducts. Mammography provides an objective graphic representation of the soft tissue of the breast and its pathologic state.

The first use of mammography in the study of the breast for cancer was the work of Salomon¹, in 1913, on gross pathologic specimens. Warren², in 1930, reported the first clinical use of mammography. Prior to the last decade, Leborgne³, Gros⁴, Lane and Pendergrass⁵, Lockwood⁶ and others continued active in the investigation of this technic, even though it was in general disuse as a clinical aid.

During the early 1950's, interest in mammography

was restimulated by the work of Gershon-Cohen et al.⁷. In addition to demonstrating palpable tumors on the roentgenograms, he was able to delineate lesions that were asymptomatic which suggested the possibility of obtaining an earlier diagnosis of breast cancer.

In December 1960, Egan⁸, then of The University of Texas M. D. Anderson Hospital and Tumor Institute, under the direction of Dr. Gilbert Fletcher, Chairman, Department of Radiology, and in close cooperation with the Department of Surgery, after four years of work reported an improved technic for roentgenography of the breast yielding a higher degree of diagnostic reliability than had heretofore been demonstrated. This high milliamperage, low kilovoltage technic, utilizing a special fine grain, industrial type film emulsion, produced a mammogram of high quality with a clear detail of the soft tissues of the breast. His data showed that of the first 1,000 breast mammographies, 43 per cent had sufficient clinical and mammographic indications to require biopsy; of the 240 breast tumors found among those biopsied, he had correctly diagnosed 238 from a prebiopsy mammogram without the benefit of clinical appraisal.

After Egan's report, a number of radiologists sought instruction in the technic from him. To meet this demand, a method of training in the technic and interpretation of the mammograms was developed. The experience of the radiologists thus trained suggested that clinicians would use mammography as a prebiopsy diagnostic aid to supplement the subjective and often indecisive evidence of palpation to reinforce the need for biopsy.

Five radiologists* associated with American Cancer Society and the Public Health Service then visited the M. D. Anderson Hospital to get first-hand information on Egan's work. They found that a unique and important factor in the successful use of this technic was the pattern of cooperation and communication which had been developed among surgeons, pathologists and radiologists in the use of mammography. These visiting radiologists were cautiously optimistic in reporting their observations, but unanimous on the point that the technic produced a mammogram of higher diagnostic quality than had previously been available. A question still remained, however, as to whether radiologists generally could

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* These radiologists include: Drs. Thomas Carlile, Chief, Department of Radiology, Mason Clinic, Seattle; Eugene Pendegrass, then Professor of Radiology, University of Pennsylvania School of Medicine; Wendell Scott, Professor of Clinical Radiology, Washington University School of Medicine; James Cooney, Vice-President for medical affairs, American Cancer Society; and Theodore Hilbish, then Chief, Diagnostic X-Ray Department, Clinical Center, National Institutes of Health.

reproduce the technic and obtain mammograms of comparable quality in their own institutions.

It was determined that a scientifically controlled study should be undertaken to find answers to these questions: Can uniformly high quality mammograms be obtained by radiologists generally? What proportion of breast malignancies are correctly diagnosed by mammography before biopsy? Could existing equipment be modified adequately to permit the use of this technic? Was this type training adequate to produce necessary competency among radiologists generally?

In undertaking this study, a division of responsibility between the Director of the National Cancer Institute, the Director of the M. D. Anderson Hospital and the Chief of the Cancer Control Program was established. The M. D. Anderson Hospital would provide training for the radiologists, conduct workshops of participants, review mammograms and tissue sections, and supply all technical services as the clinical center of the study.

The Cancer Control Program would collect reports of cases, provide statistical evaluation, assist institutions to organize for the study and supervise compliance with the protocol. The National Cancer Institute would be responsible for providing statistical consultations and assisting with analysis of the data.

It was agreed that the institutions in which the study would be carried out would be divided into two groups: ten distributed throughout Texas and the others geographically distributed throughout the United States. These institutions were selected by a committee composed of representatives of the three participating agencies.

Criteria were established as follows for carrying out the study: (1) The population was to be limited to women who were to undergo biopsy of the breast. (2) Mammographic studies were to be performed according to the technic developed by Egan. (3) Mammograms were to be interpreted by the radiologist without benefit of clinical findings. (4) All breast biopsies (not selected cases) performed by participating surgeons were to be included in this study. (5) Each of the study forms was to be sent directly to the Cancer Control Program as completed, for collating and analysis.

Training of the radiologists from the participating institutions was accomplished in a five day visit to the M. D. Anderson Hospital, during which Egan instructed them in his technic and interpretation of the mammograms. The radiologists were introduced to

case material consisting of 3,000 mammograms. Special attention was given to those mammograms demonstrating characteristics of malignant lesions. The radiologists participated actively in obtaining and interpreting mammograms. They were also introduced to the M. D. Anderson Hospital team approach in which the surgeons and pathologists were also involved in the use of mammography as well as the radiologists.

Each institution was visited, prior to the accumulation of study cases, to insure that each department involved—radiology, surgery, and pathology—understood the requirements of the protocol, the need for cooperation among the departments, and to answer questions which may have arisen.

ACCUMULATION OF DATA

In this paper, only data pertinent to the primary objectives of the study are presented. Much additional data are available for future reports.

Reports were made on six separate forms: A, Clinical Impression; B, Radiological Examination; C, Surgical Examination (operative findings); D, Pathological Report; E, M. D. Anderson Radiological Examination; F, M. D. Anderson Pathological Report. The forms were mailed by the participants to the Public Health Service as each was completed.

The study design anticipated a population of 2,600 patients undergoing mammography and biopsy. A survey of the literature indicated that approximately 20 per cent of these patients would be diagnosed with malignant neoplasms which would provide over 500 cancerous breasts. This number would be needed for the results to have statistical reliability. By February 1963 adequate data on 1,580 breast examinations were completed. In addition, there were 366 patients who were excluded from the study. Of these, in 187 cases no biopsy was performed, usually because the patient refused. Another ninety-seven cases were not included because of incomplete records. Other reasons for rejection of cases included no mammograms, male patients, the specified technic not used, and protocol not followed.

There were 475 malignant neoplasms diagnosed which represented over 30 per cent of the study population. Although the total number of patients initially planned was not obtained, the number of tumors was sufficient to justify termination of the study.

RESULTS OF STUDY

Of the 1,580 breast biopsied and mammographed, 475 were diagnosed with malignant neoplasms, 1,081 with benign lesions, and 24 with no disease. Radiologists were able to diagnose correctly 376 of the 475 malignant lesions for a true positive rate of 79 per cent.* (Fig. 1.)

Of the 1,105 breasts classified pathologically as non-malignant, the radiologists correctly diagnosed 999 or 90 per cent. (Fig. 1.) The false positive rate was then 10 per cent.** The total study population is summarized in Figure 2.

Table I presents this correlation on the 1,580 breasts for which there were both a radiologic and a pathologic diagnosis.

Table II shows that there was an increase with age in the proportion of malignant cases in which the mammogram was interpreted as positive. In the

patients under forty-five years of age, 56 per cent of the malignant lesions were correctly identified on mammography. This true positive rate increased to 77 per cent in the forty-five to fifty-nine year age group, and to 90 per cent in the sixty year and over age group.

The accuracy of mammography is affected by the density of breast tissue. The clinicians were requested to classify each breast as being normal, shotty, nodular or fatty. Eighty-three per cent of the breasts were so classified. Table III shows that the true positive rate was significantly higher in the fatty type of breast as compared with the other three types described. In the fatty breast, radiologists were able to diagnose correctly 89 per cent of those histologically diagnosed as cancer.

To recapitulate, the findings of the study show: (1) radiologists completing a five day training program correctly identified 79 per cent of malignant lesions biopsied; (2) 10 per cent of the breasts

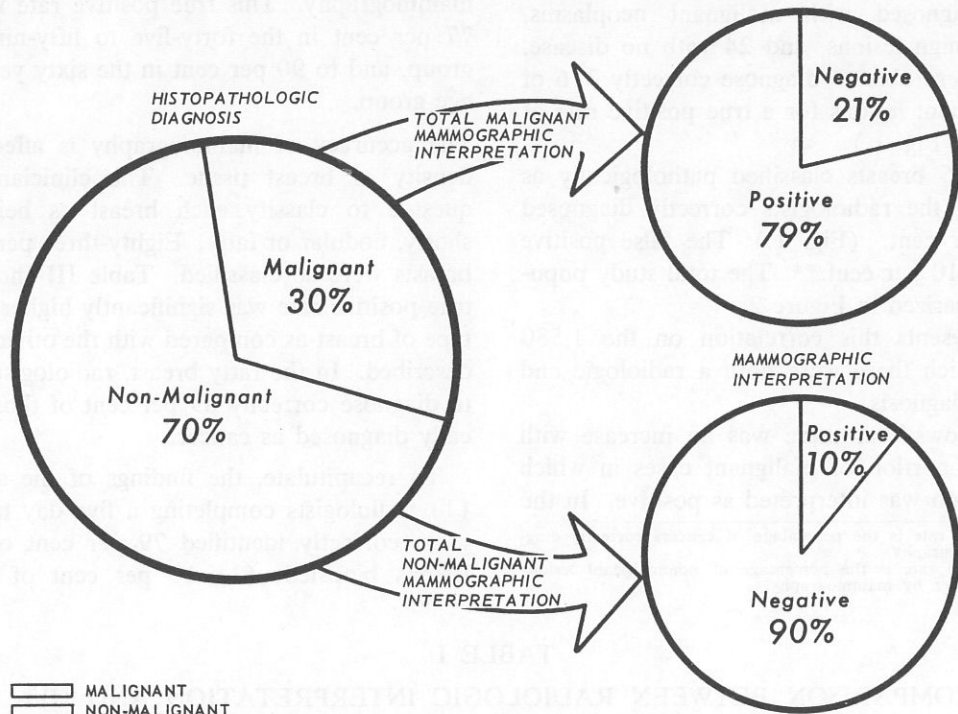
TABLE I
COMPARISON BETWEEN RADIOLOGIC INTERPRETATION AND HISTOPATHOLOGIC DIAGNOSIS BY BREAST

Breast	Nonmalignant Histopathology		Malignant		True Negative Rate	True Positive Rate
	X-ray Negative	X-ray Positive	X-ray Negative	X-ray Positive		
	Right -----	458	55	48		
Left -----	541	51	51	203	92.4	79.9
Total -----	999	106	99	376	90.4	79.2

TABLE II
COMPARISON BETWEEN RADIOLOGIC INTERPRETATION AND HISTOPATHOLOGIC DIAGNOSIS BY AGE

Age (yr.)	Nonmalignant Histopathology		Malignant Histopathology		True Negative Rate	True Positive Rate
	X-ray Negative	X-ray Positive	X-ray Negative	X-ray Positive		
	Under 30 -----	240	3	4		
30-44 -----	440	23	28	35	94.9	55.6
45-59 -----	235	45	44	147	84.5	77.0
60 and over ----	74	35	20	187	67.9	90.3
Total -----	989	106	96	373	90.3	79.5

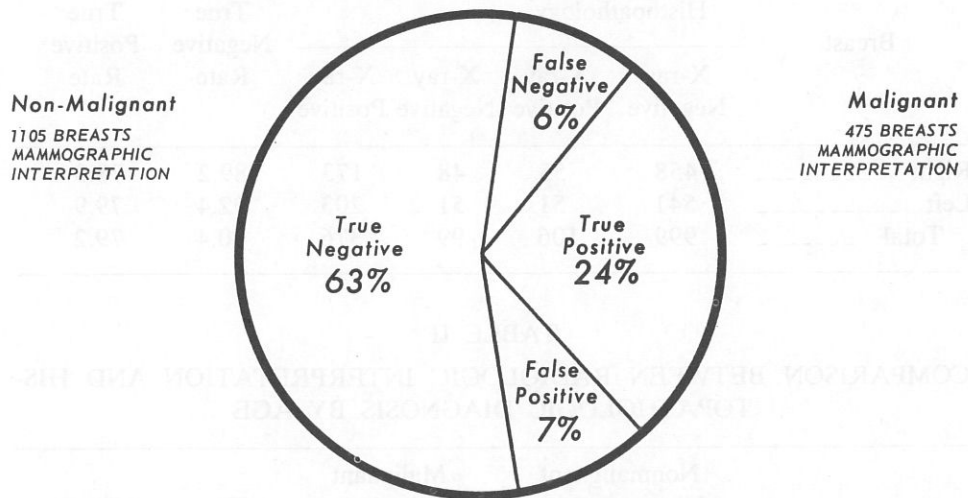
CORRELATION BETWEEN HISTOPATHOLOGIC DIAGNOSIS AND MAMMOGRAPHIC INTERPRETATION 1580 BREASTS



MALIGNANT
 NON-MALIGNANT

TOTAL POPULATION. . .

Percent Distribution of Study Breasts by Histopathologic Diagnosis and Mammographic Interpretation - 1580 Breasts



True Positive - Histologic proven cancer interpreted as positive on the mammogram
 False Positive - Histologic non-cancer interpreted as positive on the mammogram

True Negative - Histologic non-cancer interpreted as non-malignant on the mammogram
 False Negative - Histologic proven cancer interpreted as non-malignant on the mammogram

Figures 1 & 2

TABLE III
COMPARISON BETWEEN RADIOLOGIC AND HISTOPATHOLOGIC
INTERPRETATION OF BREAST LESIONS IN CLINICAL TYPES
OF BREAST

Type of Breast	Nonmalignant Histopathology		Malignant Histopathology		True Negative Rate	True Positive Rate
	X-ray Negative	X-ray Positive	X-ray Negative	X-ray Positive		
Normal -----	362	29	33	108	92.6	76.6
Shotty -----	203	18	14	43	91.9	75.4
Nodular -----	217	18	21	58	92.3	73.4
Fatty -----	62	23	12	93	72.9	88.6
Not indicated ---	155	18	19	74	89.6	79.6
Total -----	999	106	99	376	90.4	79.2

which were without malignant lesions were incorrectly identified as cancer on the mammogram; (3) the efficiency of mammography was influenced by the type of breast tissue; the true positive rate increased with the proportion of fatty tissue.

COMMENTS

The objective of the study was to see whether radiologists, operating in a variety of clinical institutions under conditions expected to be found in local communities, could reproduce Egan's quality of mammography. The study was not designed to see whether the participating radiologists could achieve as high a true positive rate as that of Egan. His population consisted of all women coming to the tumor institute with any symptoms referable to the breast, only 30 per cent of whom had either clinical signs or mammographic findings which justified biopsy.

The population dealt with in the reproducibility study, on the other hand, included only cases scheduled for breast biopsy in the general clinical institutions. This constitutes a major difference in the two groups, but it was a conscious choice in the reproducibility study to require the corroborative diagnosis of biopsy as a check of the quality of the mammograms produced, as well as the ability of the participants to interpret them. It was also decided in the reproducibility study to require consecutive biopsies, to assure that the population studied would not present selected cases, but would be a cross section of all types of lesions mammographed in the twenty-four institutions.

There is a difference in the kinds of patients seen at a tumor institute and those at other hospitals.

Cases in the tumor institute may be in more advanced stages and, therefore, more easily diagnosed. A greater percentage of patients referred because of previous primary malignancies are likely to be included. The patients at the M. D. Anderson Hospital had a higher average age than did the group in the general institutions. It will be noted in the results of the reproducibility study that the effectiveness of mammography improves with older women.

These points are not made to minimize Egan's results. It should be kept in mind that his work was done without benefit of prior clinical findings, and that the important consideration prompting the reproducibility study was that he had demonstrated both high-equality mammography and a technic which appeared to be reproducible by practicing radiologists. The objective of this study was to determine the quality of the mammogram produced by radiologists after the prescribed training program, when applied to their usual patients, that is, how effective is the procedure with general hospital patients? For this reason no attempt was made to match the study population with that examined at M. D. Anderson Hospital. These differences are mentioned here only to place in proper perspective the fact that the true positive rate of the study by other radiologists was 79 per cent, whereas Egan's was over 97 per cent.

The study was set up to test mammography as a diagnostic aid. The results obtained do not warrant any conclusions regarding the usefulness of mammography to screen women for cancer of the breast. If anything, the experience of this study might be interpreted as placing mammography for screening

some years away. The conventional x-ray unit permits convenient study of only fifteen to twenty patients a day by mammography. Furthermore, the six views of the breast require far more study for reliable interpretation than did the old screening for tuberculosis. There is real danger that tumors will be missed if there is an attempt to give a "one-minute review" to mammograms. The decision regarding the use of mammography for screening should be left to those studies designed to evaluate the application of the procedure for this purpose.

Another area of danger is that some may think that mammography can replace biopsy. Nothing learned in the course of this study would indicate that this is so. The study demonstrated that, used alone, mammography misses a significant number of lesions. There is, as before mammography, a large element of clinical judgment which must apply in the diagnosis of breast cancer. If the subjective impression of the clinician gives enough reason for suspicion of cancer, the clinician will be compelled to biopsy despite a negative mammogram.

Although the study was limited to the question of the reproducibility of the Egan technic some facts of broader concern did emerge. All lesions mammographed in the study were biopsied. Among them, there were both benign and malignant lesions, as diagnosed histopathologically. The ability of mammography to differentiate between the benign and malignant lesions would indicate the usefulness of mammography in the following breast conditions: (1) An indeterminate mass which cannot be considered a dominant nodule, but which appears to carry a high potential for cancer, also, when there are multiple cysts or several vague masses and the indication for biopsy is uncertain. (2) The opposite breast to one where there has been a previous primary site of cancer. Women with this history probably should be mammographed periodically. (3) The large, fatty breast about which there are complaints. Malignancies cannot be palpated with ease

in such breasts, but fortunately it is in these breasts that mammography is highly accurate.

Mammography makes its claim to be a diagnostic aid because of the characteristic appearance of the malignant lesion on the mammogram. A fine stippling, when present, is almost pathognomonic of cancer. There is also a characteristic infiltration of the surrounding tissues which is highly indicative of cancer. A typical skin thickening may appear over the malignancy. There is also a density in the cancer itself, which is often helpful in mammographic interpretation.

During the course of the study, it was found that adherence to the radiographic requirements is important to get results of sufficiently high quality to assure selection of cases which appear to be malignant. This factor points to the need for affording radiologists an opportunity to both learn the procedure and use it for a period long enough to permit them to become familiar with it before judgment is passed on the usefulness of mammography.

SUMMARY

The findings of the reproducibility study indicate that the technic of mammography developed by Egan can be learned by other radiologists, that films of acceptable quality can be produced, and that the interpretations provide information which is useful in the clinical management of breast disease.

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FOOD-BORNE ILLNESS

"Recent evidence shows that, even in developed countries, much more salmonellosis and other disease due to food pathogens occurs than is being reported or than had been previously suspected; possibly less than 1% of such cases are reported. Epidemiological studies of food-borne illness are complicated by the fact that foods produced and

processed in one country may be consumed in another. Better food hygiene and temperature control become increasingly necessary as the trend towards mass-cooked meals in schools, factories, institutions and homes continues."—From Environmental Change and Resulting Impacts on Health: Report of a WHO Expert Committee (Wld Hlth Org. techn. Rep. Ser., 1964, No. 292), p. 17.

FROM THE NOTE BOOK

DRUG WARNING

I am writing to remind you of the close similarity and toxicity of aminopyrine and dipyrone, an aminopyrine derivative.

This letter is being issued on the recommendation of a distinguished Ad Hoc Scientific Advisory Committee on Aminopyrine and Dipyrone and with the full cooperation of the American Medical Association.

The Ad Hoc Committee under the Chairmanship of Maxwell M. Wintrobe, M. D., Professor and Head, Department of Medicine, University of Utah, found that aminopyrine and dipyrone, a sodium sulfonate derivative of aminopyrine, are capable of causing fatal agranulocytosis. Relatively small amounts of these drugs given intermittently over a period of time, as well as regular and continued administration, can precipitate the reaction of agranulocytosis. They recommend that other antipyretics and analgesics which are much safer should be used in preference to aminopyrine or dipyrone. The only condition in which aminopyrine or dipyrone are known to be possibly indicated are febrile convulsions in children, where a parenteral antipyretic may be needed, and in rare instances of Hodgkin's disease and similar malignant diseases in which the fever cannot be controlled by any other means.

This Administration is seeking to require manufacturers of aminopyrine and dipyrone preparations to change the labeling and advertising of these drugs to warn that they may cause fatal agranulocytosis and to offer them solely for their antipyretic effect in serious or life-threatening situations where salicylates or similar drugs are known to be ineffective or are contraindicated or not tolerated.

The Ad Hoc Committee recommended that it be reconvened in about a year's time to ascertain whether the use of aminopyrine and dipyrone and the cases of fatal agranulocytosis associated with the use of these drugs have been noticeably reduced as a result of the changes in their labeling and advertising, and of efforts to remind physicians of their toxicity through the media of professional communication.

It may be well to note that the Commissioner has declared aminopyrine and dipyrone to be new drugs under the law. This is medically desirable and sound. This decision will enable our Bureau of Medicine to continuously analyze the adverse reaction incidence of these drugs through reports received from the manufacturer, as well as such data compiled through the reporting mechanisms of the Food and Drug Administration and the American Medical Association. It will make it possible to obtain the kinds of information needed by the Committee for its re-evaluation of the matter.

Prescribers should take careful note of the generic names on labels of analgesic and antipyretic drugs since the trade names commonly do not reveal whether they contain aminopyrine or dipyrone. Aminopyrine is marketed under such names as: Amidofebrin, Amidopyrazoline, Amidopyrine, Amytal w/aminopyrine, Anafebrina, Cibalgine (aminopyrine-allobarbital), Dimapyrin, Febrinina, Novamidon, Piridol, Polinalin, Pyradone and Pyramidon.

Dipyrone is marketed as: Alginodia, Bonpyrin, Dipralon Forte, Fevonil, Key-Pyrone, Migestic, Narone, Nartrate, Novaldin, Novalgin, Novemina, Paralgin, Pydirone, Pyralgin and Sulyprin.

For your further information concerning this subject, may we recommend that you consider Dr. Charles Huguley's paper entitled: "Agranulocytosis Induced by Dipyrone, A Hazardous Antipyretic and Analgesic" published in the *Journal of the American Medical Association* (189: 938, 1964).

Copies of the report and recommendations of the Ad Hoc Scientific Advisory Committee on Aminopyrine and Dipyrone may be obtained by writing to the Office of Public Information, Food and Drug Administration, Department of Health, Education, and Welfare, Washington, D.C. 20204.

S/Joseph F. Sadusk, Jr., M.D.
Medical Director

ORAL SURGERY LECTURE AT U.S. NAVAL HOSPITAL, SAN DIEGO

CAPT Philip J. Boyne, DC USN, of the USS Bon Homme Richard (CVA-31), recently presented a

lecture at the Staff Meeting of the Oral Surgical Service of the U.S. Naval Hospital, San Diego.

CAPT Boyne's lecture included a presentation of his paper which won the Research Award of the Year from the American Society of Oral Surgeons. The paper is entitled, "*A Study of Osseous Healing Following Osteotomy for the Correction of Mandibular Prognathism*".

CAPT Walter W. Crowe, Chief of the Oral Surgical Service at the U.S. Naval Hospital at San Diego, presided at the meeting, which was held at the Naval Hospital, San Diego.—Official U.S. Navy News Release, Release No. P-7-65, March 23, 1965.

From: Commanding Officer

To: Johnson, Ray D., 926 19 33, HMCA USN

Subj: LETTER OF APPRECIATION

1. You were a member of a special team which, at the request of the Somali Government, worked in Somali Republic from 10 to 24 January 1965 for the purpose of determining the cause of and making recommendations concerning the control of an epidemic of dysentery in that country.
2. I wish to add my appreciation to that already conveyed to you by the Somali Government and Mr. H. G. Torbert, Jr., American Ambassador to Somali Republic, for the outstanding contributions made by you during the conduct of the survey.
3. For your performance, which is in keeping with the highest traditions of the Naval Service, I extend to you a hearty "Well Done!"
4. A copy of this letter will be made a part of your official record.

NAVAL INTERN MATCHING SUCCESS

The Surgeon General is pleased to announce that the Navy matched 100% of the 176 interns requested under the National Intern Matching Program. Out of the more than 300 interns who listed the Navy in their choice, a majority of the 176 selected Navy as first choice. Of those matched to the Navy, almost 90% were assigned to a hospital of their first three choices and no one was assigned to a hospital which he had not requested. This is a creditable record in view of the fact that there were 5,696 internships unfilled this year.

Effort has been made to improve the attractiveness of the Naval internship. The Intern Training Committees in our hospitals are aware that we are in a competitive market and have done all in their

power to make the training programs professionally rewarding. Watch standing requirements have been changed from one in two to one in three nights on duty. Applicants are assured in advance that if we cannot assign them to a hospital within their list of choices, they will be released, upon request, from their matching contract. The clinical and research clerkships afford the potential candidate an opportunity to view the Naval internships at close range.

The Surgeon General sends his thanks to the District Medical Officers, The Commandants' Representatives in Medical Schools, the Hospital Commanding Officers and their Staffs and the many people in the Navy's Recruiting Service who make possible the success in our Intern Program.—Professional Div., BUMED.

SUGGESTED FORMAT FOR COMMAND PROFESSIONAL RELATIONSHIP WITH REPRESENTATIVES OF PHARMACEUTICAL MANUFACTURERS

1. *Background.* Detailmen can be of great assistance to the professional staff of any medical activity, but on the other hand they can also be a source of bother if they are not provided with a set of "ground rules" by which to operate. With very few exceptions, "ground rules" are welcomed by the detailmen, as well as by the staff in that product information is passed on smoothly, and at such times as are convenient to all concerned. This hospital has such a set of rules, which have been proved over a period of time, and are submitted as a possible aid to other activities who might find their present system unsatisfactory.

2. *Method.*

a. All detailmen are required to check-in at the Pharmacy before visiting any other area of the hospital.

b. Explicit instructions are personally outlined by the Chief of Pharmacy Service:

(1) The Pharmacy must be made aware of the items that are to be detailed that day to the staff. In the case of new products, complete literature must be on file in the Pharmacy before any detailing is done. This is to provide a ready reference for the staff should questions arise.

(2) Only a very small quantity of samples are left with the physician. Sampling in quantity is done only with the Pharmacy. This allows the Pharmacy to establish usage rates should the item be requested for stock, and permits a replenishment of the samples

should the physician wish to extend his clinical evaluation of an item.

(3) Each detailman is briefed as to the best hours to visit each service, and that he must detail the Chief of Service prior to detailing the individual physicians of that service.

(4) Normally, appointments are not made; however, the Pharmacy does phone an individual physician should the time of the visit be during the busiest hours of his day.

(5) Detailmen are informed as to which days of the week other detailmen are usually on board, to help space out their visits to the hospital.

(6) The Pharmacy maintains a company card file of inquiries and when the detailman checks in, he is informed of these inquiries and directed to the individual concerned.

3. Hospital Exhibits.

a. Through trial and error, this hospital has developed a method of permitting the various pharmaceutical companies to display the latest trends in therapeutics to the staff of this hospital.

b. To provide a relaxing atmosphere and traffic-free space, the lounge of the BOQ was made available for these exhibits.

c. The exhibits are held on the third Tuesday of each month, a day determined to be most advantageous to all. The hours extend from 1100 to 1400, to give sufficient time for all personnel to attend prior to, during, and after lunch.

d. The exhibits are given wide publicity through individual notices to the staff and notices published in the Hospital Daily Bulletin. A form letter is mailed to each of the representatives who normally call on this hospital and others which the command feels could benefit our staff. Because of the numerous medical activities within the Camp Pendleton complex, each is notified monthly of the pending exhibits.

e. Although this arrangement was made primarily for the medical and dental officers, and the pharmaceutical representatives we found that companies with allied products, other than pharmaceuticals, were requesting permission to exhibit their products. In addition, the Nurse Corps officers showed great enthusiasm for the opportunity to procure drug literature and ask questions concerning the problems they experience in their field. Through the visits of the Nursing Educational Coordinator, arrangements were made for non-commercial lectures to be pre-

resented to staff personnel by some of the pharmaceutical representatives.

f. The attendance by both the companies and staff has been gratifying. For instance, in November, 28 companies exhibited their products to over 150 officers of the Medical Department.

g. These exhibits have been enthusiastically received by all hands, and letters have been received from all of the companies expressing their gratitude as they felt that our method provided the best format they had experienced for detailing pharmaceuticals.

h. A photograph taken at one of the exhibits is included.

4. Conclusions.

a. The responsibility for coordinating the relationship of the detailmen with the staff must lay with the Pharmacy.

b. Established ground rules provide a harmonious and beneficial atmosphere for detailing.

c. The exhibit method of detailing takes less of the medical officer's time; he can see 20 to 30 representatives in one or two hours.

d. The set date allows the staff to plan for the meeting.

e. By having groups of medical officers inquiring about items, they seem to stimulate questions they individually may not think of, and hear comments they might not otherwise hear.



Pharmaceutical exhibits at U. S. Naval Hospital, Camp Pendleton, Calif.

f. The procedure allows the medical and dental officers to be selective and see only the representatives who have items in their particular fields of interest.—From: Commanding Officer, U.S. Naval Hospital, Camp Pendleton, Calif.

NAVAL MEDICAL RESEARCH REPORTS

U.S. Naval Medical Research Institute, National Naval Medical Center, Bethesda, Md.

1. "False Positive" Complement Fixation with Psittacosis-Trachoma Antigens Due to Antibodies in Complement Preparations: MR 005.09-1200.05 Report No. 5, December 1963.
2. Preservation of Blood by Freezing: A Review: MR 005.02-0001.07 Report No. 12, 1964.
3. Serological Studies on Group and Species-Specific Antigens of Trachoma and Inclusion Conjunctivitis (Tric) Agents: MR 005.09-1200.05 Report No. 6, 1964.
4. Relationship of Ego Identity to Psychosocial Effectiveness: MR 005.12-2601.01 Report No. 1, 1964.
5. Digenetic Trematodes of Fishes From Palawan Island, Philippines. IV. Some Immature Didymozoidae, A Bucephalid; A New Hemiuroid Genus and Subfamily: MR 005.90-1606.01 Report No. 13, April 1964.
6. Amphistome (Trematode) From Domestic Ruminants of North Borneo: MR 005.09-1606.01 Report No. 8, May 1964.
7. Tris (Hydroxymethyl) Aminomethane as a Standard for Kjeldahl Nitrogen Analysis: MR 005.02-0011.01 Report No. 4, July 1964.
8. Hemolysis by Holothurin A Digitonin, and Quillia Saponin: Estimates of the Required Cellular Lysin Uptake and Free Lysin Concentrations: MR 005.06-0010.01 Report No. 33, July 1964.
9. Nutrition of Recruits During a Summer Habitability Study: MR 005.01-0001.02 Report No. 3, Aug 1964.
10. Urolithiasis in the Rat. IV. Influence of Amino Acid Supplements on the Occurrence of Citrate Calculi: MR 005.02-0001.09 Report No. 3, August 1964.
11. The Use of Rose Multipurpose Chambers and Dialysis Membranes in the Cultivation of Exoerythrocytic Stages of Avian Malarial Parasites: MR 005.09-1030.02 Report No. 10, September 1964.

12. Elevation of Body Temperature in Health: MR 005.01-0001.02 Report No. 2, October 1964.
13. Interactions of Aryl Esters in the Tropine and ψ -Tropine Series With Tissue Chemoreceptors. The Ortho Effect. VII.: MR 005.06-0010.01 Report No. 34, November 1964.
14. Binding of Bromocresol Green by Human Serum Albumin: MR 005.02-0011.01 Report No. 6, December 1964.
15. A Plea for the Continued Use of Local Anesthesia in Major Surgery: MR 005.02-0020.01 Report No. 5, December 1964.
16. Command Historical Report 1964. (OPNAV Report 5750-5), 1965.

U.S. Naval Medical Research Unit No. 3, Cairo, Egypt.

1. Possible Factors Associated with the Relatively Low Prevalence of Dental Caries Among Egyptians 2. Fluoride in Drinking Water as Related to the Fluoride Content of Teeth: MR 005.12-5001.6, November 1964.
2. Notes on African *Haemaphysalis* Ticks. VI. *H. spinulosa* Neumann, and its Relation to Biological and Nomenclatorial Problems in the *H. leachii* Group of Africa and Asia (Ixodoidea, Ixodidae): MR 005.09-1402.3, December 1964.
3. Studies on Southeast Asian *Haemaphysalis* Ticks (Ixodoidea, Ixodidae). Redescription, Hosts, and Distribution of *H. traguli* Oudemans. The Larva and Nymph of *H. vidua* W. and N. Identity of *H. papuana toxopei* Warburton (New Combination): MR 005.09-1402.3, December 1964.
4. Phlebotomus Sandflies of the Paloich Area in the Sudan: MR 005.09.1603-1, December 1964.

U.S. Naval Medical Field Research Laboratory, Camp Lejeune, North Carolina.

1. The Prediction of Disease: MR 005.09-1160.1.2, December 1964.
2. The Effect of Strenuous Exercise on Serum Lipids and Enzymes: MR 005.09-1160.1.3, January 1965.
3. Evaluation of a Mobile-Portable X-Ray Unit: MR 005.12-6001.6, January 1965.
4. Evaluation of a Modified Ambu Resuscitator Kit: MR 005.12-6001.6, January 1965.

5. Evaluation of a Portable X-Ray Apparatus for Field Use: MR 005.12-6001.6, January 1965.
6. User Test of Casualty Moving Vehicle, Rough Terrain: MR 005.12-6001.6, January 1965.

U.S. Naval Air Development Center, Aviation Medical Acceleration Laboratory, Johnsville, Penna.

1. Effects of Positive G on Chimpanzees Immersed in Water: MR 005.13-9020.2 Report No. 10, September 1964.
2. Protection Afforded by Fire Resistant Polyamide (HT-1) Flight Coveralls in Helicopter Crash Fire: MR 005.13-1005.1 Report No. 31, November 1964.
3. Studies in Thermal Protection: I Experimental Approach and Procedures: MR 005.13-1005.1 Report No. 32, February 1965.
4. Studies in Thermal Protection: II. Protective Capacity of Two Polyester Fiber Materials: MR 005.13-1005.1 Report No. 33, February 1965.

U.S. Naval Submarine Base, Naval Medical Research Laboratory, New London, Conn.

1. Evaluation of Bicaloric Test of Vestibular Function: MR 005.14-1001-2.14 Report No. 411, Sept 1963.
2. Behavioral Periodicity: I. Bibliography of Literature Pertaining to Human Beings: MR 005.14-2100-3.09, January 1964.
3. An Annotated Department Reference File for Polaris Medical Officers: MR 005.14-3002-4.13 Report No. 429, May 1964.
4. The Psychological Dimensions of Color: MR 005.14-1001-1.34, June 1964.
5. Effect of Field Size and Position on Mesopic Spectral Sensitivity: MR 005.14-1001-1.35, June 1964.
6. Effect of Surround and Stimulus Luminance on the Discrimination of Hue: MR 005.14-1001-1.36, July 1964.

7. Discrimination of Color: IV. Sensitivity as a Function of Spectral Wavelength: MR 005.14-1001-1.37, July 1964.
8. Psychological and Psychophysiological Effects of Confinement in a High-Pressure Helium-Oxygen-Nitrogen Atmosphere for 284 Hours: MR 005.14-2100-3.10, November 1964.

U.S. Naval Aviation Medical Center, Naval School of Aviation Medicine, Pensacola, Fla.

1. Vestibular Habituation During Repetitive Complex Stimulation: A Study of Transfer Effects, September 1964.
2. An Investigation of Unpredicted Differences in Attrition Rates Among Students from Different Procurement Sources: MR 005.13-3003 Subtask 1 Report No. 40, October 1964.
3. Comparative Histological Study of the Reinforced Area of the Saccular Membrane in Mammals: MR 005.13-6001 Subtask 1 Report No. 101, October 1964.
4. Dosimetric Evaluation of the Alpha Flux in Solar Particle Beams: MR 005.13-1002 Subtask 1 Report No. 30, November 1964.
5. The Ultrastructure of the Otolith Organs in Squirrel Monkeys After Exposure to High Levels of Gravito-inertial Force: MR 005.13-6001 Subtask 1 Report No. 102, November 1964.
6. Quantitative Interpretation of the Exercise Electrocardiogram: MR 005.13-7004 Subtask 8 Report No. 3, November 1964.
7. Evaluation and Prediction of Physical Fitness, Utilizing Modified Apparatus of the Harvard Step Test: MR 005.13-3001 Subtask 1 Report No. 4, December 1964.

Aerospace Crew Equipment Laboratory, U.S. Naval Air Engineering Center, Philadelphia, Penna.

1. Indirect Basophil Degranulation Test in Penicillin Allergy: MR 005.12-1406 Subtask 4, April 1964.

INFORMATION ON CHOLERA

After an interval of 14 years, cholera broke out in Bombay City in May 1964. There were 2000 cases, with a case-fatality rate of 5%. Phage-typing of 111 vibrio strains isolated during the outbreak was carried out by the WHO International Refer-

ence Centre for Vibrio Phage-Typing at Calcutta. The results suggest that the Bombay epidemic originated in neighbouring areas, where strains of phage-types and sero-types identical to those isolated in Bombay were found.—WHO Chronicle, 19(3); 124, March 1965.

DENTAL SECTION

ORAL HYGIENE OF THE INTERDENTAL AREA

Joe H. Smith, Tod W. O'Connor, and William Radentz, Jour Periodont, Sept-Oct 1963.

The interdental papilla is often diminished in size or completely lost due to processes of aging, disease or periodontal surgery, resulting in an exaggerated interproximal space and an awkward problem in maintenance of adequate oral hygiene. This problem is compounded when adjacent root surface or surfaces are concave. The many aids advocated for use in cleansing such areas include the toothbrush and its variations, wood stimulators, rubber stimulators, waxed or unwaxed dental floss or tape, twisted wire stainless steel brushes of .016 gauge, pipe cleaners, etc., all of which help but are not effective to the degree required to effectively clean embrasures devoid of normal papillae. The authors demonstrate a simple and excellent technique utilizing eight inch lengths of three ply knitting yarn. The length of yarn is folded double then an eight inch length of unwaxed dental floss is threaded through the loop (or bight) of yarn. Folded back on itself and secured to the yarn with a simple overhand knot. The floss, which can usually be easily slipped through the embrasure, now acts as a pull through for the double yarn. The adjacent teeth are polished separately with a buccal lingual motion. The double yarn is excellent for cleaning fixed or partial denture abutments, isolated teeth or those separated in diastema. The yarn provides an effective vehicle for carrying desensitizing or stannous fluoride preparation to interproximal or other inaccessible tooth surfaces. The use of a disclosing tablet or solution is a most dramatic means of demonstrating to a patient the need for this technique in home care. Patient use of the disclosing tablet is particularly helpful in determining for himself when the surfaces are clean. Should knitting wool be objectionable to some patients due to loose strands, synthetic fibre such as rayon or nylon can be used as effectively.

This reviewer has used the technique for over a year and found that it does in fact solve what here-

tofore had been a real problem for most postsurgical periodontal patients. An added benefit can be derived if the patient will use the yarn to bring pressure apically, against the papilla, and thus tend to form the tissues. During healing following periodontal surgery, this technique seems to lessen the incidence of overgrowth and hasten the maturation of the tissues.

(Submitted by: CDR Walter N. Johnson DC USN, U.S. Naval Dental Clinic, Camp Pendleton, California.)

FACTORS INFLUENCING CENTRIC RELATION RECORDS IN EDENTULOUS MOUTHS

A. A. Yurkstas, K. K. Kapur, Jour Pros Den 14(6): 1054-1068, 1964.

The authors report their findings on an investigation of discrepancies that are found when variables are introduced in two popular technics of registering centric relation. These are the intraoral Gothic arch (needle point tracing) and the wax recording method. Both systems have been criticized in varying degree and a review of the opinion of several investigators is given. This study was carried out to evaluate the effect of various factors on the reliability or duplicability of the two methods. The basic premise used was that the more accurately a record could be duplicated the more likely it was to be correct.

Stabilized base plates were constructed for 35 patients. Five patients were evaluated for each variable: wax recording technic, intraoral tracing procedure, inclination of the central bearing plate, inclination of the tracing plate, amount of pressure exerted, and type of ridge.

The paper gives a comprehensive report on the results of the investigation. Tables, bar graphs, and tables of critical ratios which compare the various procedures illustrated the findings in an outstanding manner.

The purpose of this study was not to evaluate the accuracy of one recording procedure over another but to emphasize the fact that there are many variables which can enter into any recording procedure

when care is not taken in its execution. In the wax recording procedure, the degree of hardness, the degree of bilateral homogeneity, the amount of occlusal contact, and the presence or absence of anterior freedom influenced duplicability to a significant level. In the intraoral (needle point) tracing procedure, the location of the central bearing point anteriorly, posteriorly, or laterally; the inclination of the central bearing point in relation to the tracing plate (whether it be perpendicular or mounted on an angle to it); and the inclination of the tracing plate in relation to the underlying bearing surfaces played an important part in determining the duplicability of the records. Heavy closing pressure adversely influenced the duplicability of the records under these conditions. It is recommended that centric records be made with accurately fitting base plates under minimal pressure which is centralized and distributed uniformly to the underlying denture bearing areas.

An outstanding discussion of the paper is given by Dr. George A. Hughes.

(Abstract submitted by: CAPT C. D. Hemphill, DC USN.)

ZIRCONIUM SILICATE FOR USE AS A CLEANING AND POLISHING AGENT FOR ORAL HARD TISSUES

*J. C. Muhler, N. J. Dudding and G. K. Stookey,
Jour Periodont 35(6): 481-485, 1964.*

A variety of methods can be used to measure enamel luster, one being to evaluate the abrasive for its ability to polish a dull surface and at the same time to determine the dulling quality of the abrasive on a highly polished surface. The optimal dental abrasive would be one which would raise a dull surface to a high polish and not dull a highly polished surface.

The abrasive in the prophylactic paste must clean teeth and hopefully polish them also. This paper concerns the use of a new abrasive, Zirconium Silicate ($ZrSiO_4$), as the basic constituent of a prophylactic paste and describes its unique characteristics of being an excellent cleaning and polishing agent, but producing minimum damage to tooth structure.

To evaluate the ability of $ZrSiO_4$ to clean and polish teeth, it was compared with the ability of flour, pumice and lava pumice in removing six different common forms of tooth stain or pigmentation. In these comparisons, patients having the particular type of stain or enamel pigmentation had either their respective left anterior maxillary central incisor,

right anterior maxillary central incisor, or their two mandibular central incisors cleaned with the three respective abrasives. Patients were randomly divided to evaluate the cleaning and polishing ability of the three abrasives. All abrasives were formulated to have the same powder/water ratio (7:1) and all tooth surfaces were polished for exactly thirty seconds and then evaluated for effectiveness of cleaning.

A total of 61 patients had teeth with green stain. This stain, along with the black form and pigmentation from SnF_2 is known to be the most difficult to remove. Flour of pumice cleaned 19 cases, lava pumice 34, and $ZrSiO_4$ 60. Black stain, most frequently resulting from the excessive use of tobacco, is also quite difficult to remove satisfactorily in many instances. Of the patients having black stain, two were removed with flour of pumice, five with lava pumice, and twelve with $ZrSiO_4$. Similar proportionate results were found for removal of pellicle, yellow stain, and brown stain.

The ability of $ZrSiO_4$ to clean and polish silver amalgam restorations and gold inlays was interesting. The use of $ZrSiO_4$ produced an excellent luster on even very old silver amalgam restorations and gold inlays. Some dentists have questioned the wisdom of polishing silver amalgams, in that it may weaken the margins of the restoration, but preliminary work using $ZrSiO_4$ showed that due to its low abrasiveness it was less damaging in this regard than other commonly used agents. Moreover, a clean and high polished amalgam reduces food retention and may play an important role in reducing dental caries at the margins of restorations. This is an area needing re-evaluation in light of the new data resulting from the use of $ZrSiO_4$.

In cases with stubborn stains and pigmentation, the minimum amount of water should be added to the powder to produce maximum cleaning. A "soupy" mix may be required for maximum polishing. It has been found that a slow rotation of the prophylaxis cup produces a tooth surface with maximum luster in contrast with using a cup at excessive speeds.

(Submitted by: CAPT Perry C. Alexander, U.S. Naval Dental Clinic, Long Beach, California.)

SOME PRECAUTIONS TO OBSERVE IN APPLICATION OF THREE-AGENT STANNOUS FLUORIDE TREATMENT

The dental officers of Naval Training Center, San Diego, and the 12th Dental Company, Fleet Marine Force, Atlantic, have brought to this Bureau's atten-

tion some untoward experiences that they have had because of lack of care on the part of dental personnel providing treatment. In one case, the dental technician placed the stannous fluoride prophylaxis paste in the rubber cup and started the engine before the rubber cup was in the patient's mouth. A few particles of the paste flew into the patient's eye and was not washed out until the treatment was completed. As a result, the eye was chemically burned. However, the patient recovered in three days with proper treatment. To avoid accidents of this type, do not start the engine before the rubber cup with the paste is in the patient's mouth; the dental technician should always wear glasses himself; and if the paste should accidentally enter an eye, it should be washed out immediately and the man should be referred to the medical officer.

At the Naval Training Center, San Diego, it was noted that if stannous fluoride in paste or aqueous solution was dropped on uniforms, it caused staining of the uniform which could not be removed. *This was corrected by draping the patient with a plastic apron before the treatment was started.* In addition, some dental technicians whose primary duty was the application of the three-agent stannous fluoride treatment noticed that their hands became sore after a period time if they did not *apply a hand lotion or wear rubber gloves.*

—Dental Section, BUMED.

DENTAL HEALTH EDUCATION MATERIAL

The Chief, Dental Division, Bureau of Medicine and Surgery, is vitally interested in dental health education material that has been developed by individual dental officers in carrying out their Preventive Dentistry Programs; therefore, it is requested that a copy of articles appearing in station papers, pamphlets, booklets, and audiovisual aids be sent to Code 611 of the Dental Division for compilation and dissemination on a Navy-wide basis via the *Medical News Letter* or other means.

An outstanding example of initiative and imagination on the part of a dental officer in this direction is the successful effort of Commander R. Austin DC, USN. While Preventive Dentistry Officer, Naval Training Center, Great Lakes, Illinois, he developed a dental health message to be placed on paper milk cartons which was accepted by the dairy supplying milk to the Navy Commissary. Now every milk carton sold at this activity carries the below pictured daily dental health reminder to all who purchase milk at this activity's Commissary. There must be



many other dairies that would do the same, and it is reasonable to assume that there are many other equally good ideas and dental health messages that are not getting the dissemination they should have.

KNOW YOUR DENTAL CORPS

(Second in a Series)

3D DENTAL COMPANY, 3D MARINE DIVISION, FLEET MARINE FORCE, PACIFIC

The 3D Dental Company has the honor of being part of one of our Nation's most powerful retaliatory forces, the Fleet Marine Force, Pacific, specifically the 3D Marine Division. In its role with the 3D Marine Division, the 3D Dental Company's mission is to provide complete dental service to the Marines in the field.

From combat experiences encountered during the World War II and the Korean Operations, it had become evident that a reorganization of the dental service of the fleet marine force was necessary. During these periods of hostilities, dental personnel were organic to units of the division, and consequently accompanied their parent unit into early phases of combat operations. In many instances dental personnel were limited in performing dental services due to the fluctuating and unstable combat engagements. Not being able to perform their primary duties, dental personnel were actually a hindrance to initial landing operations.

Realizing the ineffectiveness of the dental service with the fleet marine force, studies were initiated in 1951 to improve the organization of the dental service and its capabilities in field operations. In 1955 after studies and modifications were completed, dental companies were first authorized for ground troops.

The Dental Company is a separate force level organization composed of naval dental personnel and is commanded by an officer of the Naval Dental Corps. Designated as a ground unit, the Dental Company has the capability of supporting a major FMF unit such as the 3D Marine Division. Being part of the FMF requires the 3D Dental Company to be a flexible organization that can deploy, completely, with an entire marine division or provide dental detachments for support of battalion or regimental type operations in trouble spots in the Western Pacific.

Although the Company enjoys the use of six modern and well equipped dental clinics while in garrison on Okinawa, deployments of dental detachments require that dental field equipment also be utilized in the treatment of dental patients. While operating with Battalion Landing Teams or Marine Expeditionary Units, dental officers and dental technicians assigned to the Dental Detachment must be fully prepared to deploy with complete technical field dental equipment, as well as Marine Corps field equipment, to furnish dental support under all field conditions and environments unique to Marine Corps operations.

In preparation for duty with the 3D Dental Company, all officers and enlisted personnel receive a course of instruction at Field Medical Service School, Camp Pendleton, California in the basic principles of field medicine and the fundamental concepts of Marine Corps organization and operation. After reporting to the Company, dental personnel have their

training continued and reinforced through field training associated with actual operational deployments with FMF units. Annually a company level field training exercise is conducted to test the combat readiness of the men and equipment of the 3D Dental Company.

A prime example to this type of readiness and mobility was demonstrated in a recent joint U.S. Marine Corps and U.S. Air Force exercise called Reflex I. During this highly successful training exercise a dental detachment consisting of one dental officer and one dental technician accompanied a Marine Expeditionary Unit to Mactan Island, Republic of the Philippines. Within hours after their alert the dental detachment was completely outfitted and airlifted by Air Force C-130's, with a fully equipped landing team of the 3D Marine Division from Okinawa to Mactan Air Field. The exercise was designed to perfect the swift air lift of Marines from Okinawa to potential Asian trouble spots.

During their brief stay in Mactan the dental detachment set up its field equipment and was prepared to render full dental support to the Marine Expeditionary Unit. Before concluding the operations Colonel E. B. Wheeler, USMC and Captain J. N. Gossom, DC, USN as representatives of the 3D Marine Division made presentations of dental and medical supplies and a set of encyclopedias to the local Philippine town of Lapu-Lapu. This gesture of goodwill was made through the town Mayor at a meeting with the local town council.

Since 1955 when the dental companies were first established, dental personnel serving in these units have found duty with the Marines a rewarding experience. Especially in these critical times, members of the 3D Dental Company are proud to serve with the FMF.

—Dental Section, BUMED.

PERSONNEL AND PROFESSIONAL NOTES

Selections for Advanced Training. Based on the recommendations of the Dental Training Committee, which convened on 2 March 1965, the following candidates were selected for advanced training in FY 1966.

The 28 Naval Dental School student officers were selected from 96 applicants. Seniority is the principal consideration for this selection on the premise that one purpose of the Naval Dental School is to bring the most recent advances in dentistry to the

knowledge of dental officers at an appropriate interval in a Navy career. Of those 28, approximately 14 will take the course in General Dentistry, and the others will major in one of the clinical specialties. Those who intend to pursue further specialty training may enroll in the graduate program; others may enroll as postgraduate students. The graduate students will compete academically in the Naval Dental School off-campus graduate program of Georgetown University Dental School.

All dental officers are reminded that completion of an NDS course is not an essential in a career pattern. Selection Boards consider each officer's entire record. The vigorous individuals with consistently excellent records are selected for advancement in rank. Having completed the NDS graduate or postgraduate course is not necessary.

Another subject which is often misunderstood is the fact that a graduate or postgraduate NDS course is one of three prerequisites for eligibility for further specialty training, either toward Board qualification or toward the basic sciences for research. Those three alternative prerequisites are the NDS course,

a M.S. degree or a Naval Dental Corps Postdoctoral Fellowship.

The records achieved in these prerequisites are used as a screening device to identify those dental officer graduate training applicants who have proven outstanding potential for graduate level study.

Next year's meeting of the Dental Training Committee will be held in early January rather than March. A forthcoming change in the BUMEDINST 1520.2 (series) and MANMED will announce this earlier date and a deadline of 1 November 1965 for the submission of all applications.

GRADUATE AND POSTGRADUATE COURSES (28)

CDR B. F. Kresl, DC USN
CDR H. D. Tow, Jr., DC USN
CDR W. P. Kelly, DC USN
CDR J. R. Bohacek, DC USN
CDR R. H. Orrahood, DC USN
LCDR A. F. Reid, DC USN
LCDR R. E. Shirley, DC USN
LCDR D. E. Hayes, DC USN
LCDR J. H. Charles, Jr., DC USN
LCDR D. E. Barlow, DC USN
LCDR D. N. Firtell, DC USN
LCDR E. J. Collevacchio, DC USN
LCDR Z. Kawashima, DC USN
LCDR J. R. Russell, DC USN

LCDR C. N. Clark, III, DC USN
LCDR J. J. Lawrence, Jr., DC USN
LCDR M. R. Wirthlin, DC USN
LCDR D. D. Albers, DC USN
LCDR D. E. Duncan, DC USN
LCDR L. M. Muldrow, DC USN
LCDR R. N. Dodds, DC USN
LCDR W. A. Grimsley, Jr., DC USN
LCDR E. J. Masser, DC USN
LCDR D. M. Grove, DC USN
LCDR L. E. Mark, DC USN
LCDR N. D. Wilkie, DC USN
LCDR R. E. Moore, DC USN
LCDR J. S. Kitzmiller, DC USN

ORAL SURGERY TRAINING (15)

CDR E. C. Allen, DC USN
CDR T. W. McKean, DC USN
LCDR J. T. Anderson, DC USN
LCDR J. D. Cagle, DC USN
LCDR W. R. Martin, DC USN
LCDR T. F. McCann, DC USN
LCDR J. M. Wilson, DC USN
LCDR R. D. Baker, DC USN
LCDR O. V. Hall, DC USN
LCDR E. G. Mainous, DC USN
LCDR H. O. Scharpf, DC USN
LCDR J. J. Verunac, DC USN
LT E. B. Bass, DC USN
LT H. C. Howarth, DC USN
LT W. C. Johnston, DC USN

Second Year Residency
Second Year Residency
Second Year Residency
Second Year Residency
Second Year Residency
Second Year Residency
Second Year Residency
Second Year Residency
First Year Residency
First Year Residency
First Year Residency
First Year Residency
Postdoctoral Fellowship
Postdoctoral Fellowship
Postdoctoral Fellowship
Postdoctoral Fellowship

PROSTHODONTIC TRAINING (9)

LCDR K. E. Brown, DC USN	Residency
LCDR J. W. Hays, DC USN	Residency
LCDR J. E. Miller, DC USN	Residency
LCDR V. A. Pinkley, DC USN	Residency
LCDR J. F. Scott, DC USN	Residency
LCDR R. R. Thomason, DC USN	Residency
LCDR T. L. Whatley, DC USN	Residency
LCDR J. H. Hegley, DC USN	Postdoctoral Fellowship
LCDR J. E. Hyde, DC USN	Postdoctoral Fellowship

PERIODONTIC TRAINING (11)

LCDR R. C. Edwards, DC USN	Long Course Civilian Institution
LCDR E. J. Heinkel, DC USN	Long Course Civilian Institution
LCDR C. J. McLeod, DC USN	Long Course Civilian Institution
LT S. V. Holroyd, DC USN	Long Course Civilian Institution
LCDR W. J. Gorman, DC USN	Residency
LCDR G. W. Rice, DC USN	Residency
LCDR T. A. Bodine, DC USN	Postdoctoral Fellowship
LCDR R. J. Chutter, DC USN	Postdoctoral Fellowship
LCDR E. E. Little, DC USN	Postdoctoral Fellowship
LT J. E. Groat, DC USN	Postdoctoral Fellowship
LT P. W. O'Shields, DC USN	Postdoctoral Fellowship

ENDODONTIC TRAINING (5)

CDR R. W. Mendel, DC USN	Residency
LCDR H. Clarke, DC USN	Residency
LCDR M. S. Davis, DC USN	Residency
LCDR J. I. Tenca, DC USN	Residency
LCDR J. H. Burke, DC USN	Postdoctoral Fellowship

OPERATIVE DENTISTRY TRAINING (1)

LCDR C. J. Schultz, DC USN	Long Course Civilian Institution
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ORAL MEDICINE TRAINING (1)

LCDR P. S. Coombs, DC USN	Residency
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DENTAL SCIENCE AND RESEARCH (2)

LT A. B. Luke, DC USN	Postdoctoral Fellowship
LT P. B. Carroll, DC USN	Postdoctoral Fellowship

Dental Officer Presentations. CAPT L. A. Benson, DC USN, 2nd Dental Company, 2nd Marine Division, FMF, Camp Lejeune, North Carolina, presented a lecture entitled, "The Current Status of Gingivectomy in Periodontal Therapy," before the Southeastern Periodontal Study Club of North Carolina on 17 February 1965.

CAPT Gordon H. Rovelstad, DC USN, U.S. Naval Dental School, Bethesda, Maryland, presented

a lecture entitled, "Current Concepts of Preventive Dentistry," before the Kanawha Valley Dental Society on 6 April 1965 in Charleston, West Virginia.

CAPT Frank J. Kratochvil, DC USN, U.S. Naval Dental School, Bethesda, Maryland, presented a lecture entitled, "Removable Partial Dentures," before the Philadelphia County Dental Society on 21 April 1965 in Philadelphia, Pennsylvania.

CAPT James B. Lepléy, DC USN, U.S. Naval

Dental School, Bethesda, Maryland, presented a lecture entitled, "Post-surgical Prostheses," before the School of Dentistry, Ohio State University on 15 April 1965 in Columbus, Ohio.

CDR George H. Green, DC USN, U.S. Naval Dental School, Bethesda, Maryland, presented a paper entitled, "Oral Lymphomas," before the American Academy of Oral Pathology during the annual meeting 31 March-April 1965 in Las Vegas, Nevada.

Montgomery-Bucks Dental Society Meets. CAPT William E. Crolus, Dental Officer of Naval Air Station, Willow Grove, Pa., was host at a dinner and professional meeting, of the Montgomery-Bucks Dental Society of Pa., on 25 January 1965.

A total of 170 civilian dentists from nearby communities, as well as dental officers from Navy, Army and Air Force activities, in the Philadelphia area, were in attendance.

CAPT Richard T. Blackwell, DC USN, a member of the teaching staff, at the U.S. Naval Dental School, National Naval Medical Center, Bethesda, Md., spoke on the "Practical Approach to Daily Operative Procedures."

Retirement of Officers During the 3rd Quarter FY 1965. The following officers were placed on the retired list during the 3rd quarter FY 1965:

CAPT Bruce K. Defibre, USN
CAPT Ralph B. Haynes, USN
CAPT Joseph R. Horn, USN
CAPT August Bartelle, USN
CDR Charles W. Stevens, USNR

Procedure for Addressing Official Correspondence. The following quote from Navy Regulations is printed as a reminder of the procedure for addressing

official correspondence. An increasing volume of improperly directed mail has stimulated this release. To date no embarrassing situations have developed, and it is hoped this will correct the practice and prevent any problems.

U.S. Navy Regulations

1607. Addressees.

1. Official correspondence intended for the incumbent of an office and pertaining to that office shall be addressed to him by title and not by name.

2. Official correspondence intended for the Navy Department shall be addressed to the Chief of the bureau or office having control of the subject matter.

3. Official correspondence intended for a command or activity shall be addressed to the commanding officer or officer in charge, as the case may be. This paragraph shall not be construed to prevent the direct exchange, between subordinates *with a command or activity*, of memoranda, reports, and similar correspondence required in the performance of their duties.

4. Except in the case of official correspondence intended for ships, the address may be followed by the title or the code designation of the office having immediate responsibility for the subject matter.

5. Official correspondence erroneously addressed shall be forwarded by the recipient to the proper addressee if known, and notice of such action shall be forwarded by the recipient to the proper addressee if known, and notice of such action shall be sent to the originator and to the activity from which received. If the proper addressee is unknown, the correspondence shall be returned to the originator.

AVIATION MEDICINE SECTION

NEW DEVELOPMENTS IN NAVAL AVIATION SEA SURVIVAL EQUIPMENT

CAPT Roland A. Bosee, MSC USN, Bureau of Medicine and Surgery and Bureau of Naval Weapons.

In 1946, Naval Aviation efforts were directed toward low temperature protective clothing for pilots and crewmen which eventually led to the constant wear MK-5 anti-exposure suit, the quick-donning suit and most recently the wet suit for helicopter rescue crewmen. These clothing items, it is em-

phasized, provide only short term (measured in hours) low temperature protection. Elsewhere, efforts in the Naval Aviation area to provide long term, low temperature survival potential in the life raft area were minimal.

In 1962, the Bureau of Naval Weapons assigned

to the Aerospace Crew Equipment Laboratory the responsibility as lead laboratory for the development of sea-survival equipment, including the life rafts and life preservers. Since that time, new efforts were directed toward the following objectives:

- a. providing long term, low temperature survival potential for the para-raft and multi-place rafts, and
- b. providing life preservers with flotation and dry wear qualities superior to present designs.

The following is a report on the current status of equipment developments which are related to these two goals.

1. *One-Man Raft with Insulating Canopy*—There has been no significant change in the one-man raft since World War II, primarily because the aircraft seats where they are stowed set a premium on space available for survival equipment and proposed improvements increased the raft cube beyond allowable limits. In general, the cubage limits available for one-man rafts have been established at 7 $\frac{3}{4}$ x 15 $\frac{1}{4}$ x 3 inches (354 cu. in.). However, aided by recent new lightweight fabric developments, the ACEL has developed an improved one-man raft within the parameters of the package size of the current PK-2 and MB-4 rafts with the following additional features:

- a. *Double-Layer (orally inflatable) Canopy*—configured to accommodate a pressure suited survivor. Insulation is provided by the dead air space between the canopy layers.
- b. *Increased Raft Length and Width*—7 inches longer and 7 inches wider inboard than the current PK-2 and MB-4 for added comfort.
- c. *Two Ballast Buckets*—plus floor with lower center of gravity for increased stability in a sea-way.
- d. *Inflatable Seat*—to reduce low temperature heat loss and discomfort in the buttocks area.

Laboratory test and evaluation of the new model raft have not been completed. No data on the low temperature protection effectiveness of the raft are available at this time, but it is clear that the new raft offers more low temperature protection than the current raft—which offers little or none at all. Requirements are being developed, and it is planned to purchase 100 rafts for fleet evaluation. Since the raft is capable of installation in the helicopter back-pack raft container, it is further planned to deliver some of these rafts to HU-1, HU-2 and HS squadrons for evaluation. It is anticipated that the rafts will be delivered to the field by June 1965.

2. *Multi-Place Life Rafts*—This newly developed 25-person capacity life raft is directly aimed at low-temperature protection for survivors and has a number of interesting new features such as:

- a. *Self-Erecting Canopy*—Canopy erects when raft inflates.
- b. *Double Layer Insulating Canopy*—Insulation is provided by dead air space between the canopy layers as in the Bureau of Ships and British ship-board rafts.
- c. *Increased Capacity*—Has a 25-person capacity but occupies the same package volume as the current 20-man raft.
- d. *Insulated (inflatable) Seats*—To prevent heat loss and discomfort in buttocks area in cold waters.
- e. *Ballast Buckets*—For improved raft stability.
- f. *Detection Light*—Located on top of canopy, lights up when raft is inflated.
- g. *Boarding Lights*—Small salt-water activated lights at boarding stations.
- h. *Inboard Stowed Survival Equipment*—For ready access.

Consideration is also being given to inclusion of an automatic signal beacon. This raft has just been delivered by the contractor for laboratory evaluation. *A contract for similar changes to the MK-7 raft has been recently awarded.* Ultimate aim is to provide automatically erectible, insulating type canopies on all multi-place rafts.

3. *Cool-Gas Generation for Life Raft Inflation*—Two development efforts are under contract in this area for application to one-man rafts in lieu of the current CO₂ system. Successful application would permit rapid inflation in all temperature environments and eliminate the possibility of raft fabric cold cracking (and subsequent leakage) in low temperature inflations.

4. *Heating Equipment for Survival Application*—The Bureau of Naval Weapons is also sponsoring the first phase of a development program for a hydrogen-generator, catalytic heater that could possibly be incorporated within an aviator's clothing and survival gear with its heat output being applied directly to the body surface and the floor of the life raft. In concept, the proposed system reacts solid sodium aluminum hydride with sea water to generate hydrogen, mixes the hydrogen with air in the proper dilute non-explosive ratio (by aspiration or pumping using hydrogen pressure) and employs low temperature catalytic combustion in beds located within or at the entrance to clothing ensembles at the body

extremities and in the life raft. Inflation gas for the raft would be provided by the hydrogen-air mixture.

5. *A New Life Preserver Concept*—The current Naval Aviation life preservers, the MK-2, MK-3, and the MK-4, are worn *outside* of various flight clothing and are unsatisfactory in varying degrees with respect to their bulk, dry wear and flotation characteristics. A new life preserver system (designated the MK-5) has been found capable of installation *inside* various existing and proposed flight clothing which reduces or eliminates bulk from frontal, underarm and back areas of the aviator to provide improved dry-wear characteristics. The MK-5 preserver unit is specifically designed to provide flotation characteristics superior to those of the three current Naval Air preserver types. This new development includes:

a. *Life Preserver Element*—The basic life preserver element is constructed of coated fabric, provides approximately 55 pounds of buoyancy at 70°F at an internal pressure of 1.75 psig. Two dual pull CO₂ cylinder holders, four 12-gram capacity CO₂ cylinders, two manifolds and two oral inflation valves comprise the inflation system. The preserver is compartmented with the CO₂ charge inflating the collar section and the other charge inflating the body lobes. This permits inflating the preserver body lobes during parachute descent for immediate buoyancy on water landing with collar inflation after release of parachute. Both compartments, of course, can be inflated simultaneously if desired by merely tugging both CO₂ toggles at the same time. After boarding the raft, the collar section can be deflated via an oral valve if desired for greater comfort. The preserver is folded in and securely anchored to the particular clothing unit, but is removable. No size grading of the preserver is needed. On actuation of the CO₂ inflation system, the buoyancy element "pops out" of the frontal and collar areas of the suit.

6. *Summer Flight Coverall with Internal Harness and Integrated Flotation*—*Intended Use*—For ejection seat type aircraft (non-pressure suit flights) summer flight clothing configuration.

Purpose—To replace the current three-piece combination of summer flying coverall, the integrated harness suit and the MK-3C life preserver with a single donning unit so as to increase pilot comfort and provide superior flotation characteristics.

Description—Summer flying coverall of flame resistant fabric (HT-1) incorporates a parachute harness and integrated flotation unit into a single donning unit.

Test Status—Sea tests by the ACEL, parachute jump tests by the Naval Aerospace Recovery Facility, El Centro and comfort tests by Naval Air Test Center, Patuxent River were satisfactory.

Development Status—Award of 257 units for field evaluation has been made for anticipated June 1965 delivery.

7. *Summer Flight Suit with Integrated Flotation*

Intended Use—For use by pilots and crewmen of nonejection seat type aircraft.

Purpose—To increase pilot dry wear comfort and to provide flotation that is superior to the current MK-2 life preserver.

Description—This development consists of a summer flight suit with flotation unit inside the frontal and collar areas.

Test Status—Laboratory models are being constructed for comfort evaluation by the Naval Air Test Center, Patuxent River and jump testing with back and seat type parachutes by the Naval Aerospace Recovery Facility, El Centro.

Development Status—Purchase of a field evaluational quantity are anticipated during this fiscal year.

8. *Torso Restraint Flotation Assembly*

Intended Use—For use over the MK-5 anti-exposure suit in ejection seat type aircraft (non-pressure suit flights).

Purpose—To replace the MK-3C life preserver which has unsatisfactory, dry wear characteristics.

Description—This development consists of a torso restraint garment with parachute harness sewn within the two layers of the garment combined with the internally integrated flotation system.

Test Status—Sea tests of prototype by the ACEL were successful, comfort tests by the Naval Air Test Center, Patuxent River were also successful and a model is scheduled for delivery to the Naval Aerospace Recovery Facility, El Centro for jump testing.

Development Status—A contract has been awarded for 100 units for field evaluation with anticipated delivery in March 1965.

9. *Helicopter Survival Garment (Hanson Vest)*

Intended Use—For use by helicopter pilots and crewmen and most particularly for use by Helicopter Anti-Submarine Squadrons over anti-exposure or summer flight suits.

Purpose—To replace the two-piece combination of MK-2 life vest and back-pack raft with a single donning torso unit which combines preserver and

raft to provide greater pilot comfort, superior pre-server flotation and survival equipment stowage.

Description—This development consists of a single donning torso unit with the flotation element integrated into the frontal area of the garment and a raft in the back of the garment. Pockets are provided in the front for installation of survival equipment.

Test Status—Sea tests were satisfactory.

Development Status—A contract has been awarded for 70 units for field evaluation with anticipated delivery in January 1965.

10. Helicopter Survival Flight Coverall (Proposed)

Intended Use—For helicopter pilots and crewmen and most particularly for use by Helicopter Anti-Submarine Squadrons in warm climates.

Description—This garment is similar to the summer flight suit with integrated flotation described in 7 above except that a removable backpack raft container is attached to the back area of the garment by life-a-dot fasteners.

Test Status—Not tested.

Development Status—One prototype prepared.

DATA ON AEROSPACE CREW EQUIPMENT LABORATORY DESIGN PARARAFT WITH LOW TEMPERATURE PROTECTION

	<i>New Design Raft</i>	<i>Current PK-2 and MB-4 Raft</i>
1. Package Size	7¾" x 15¼" x 3" (354 cu. in.)	7¾" x 15¼" x 3" (354 cu. in.)
2. Weight	8 pounds	7 pounds
3. Inflated Dimension	<i>Length</i> Inboard 4' 7" Outboard 5' 9¼" <i>Width (INBOARD)</i> Bow Section 22¼" Amidships 19¼" Stern Section 15½"	4' 0" 5' 0" 15½" 15½" 15½"
4. Canopy	Double layer, tufted, orally inflatable for insulation, Velcro closure, configured to accommodate pressure suited survivors	Single layer, non-insulating, snap fastener closure
5. Inflatable Seat	Tufted, orally inflatable	Not present
6. Floor	Constructed so as to provide lower center of gravity for seated occupant (1)	Conventional
7. Ballast Buckets	Two provided on floor of bow	Not present
8. Tube Diameters	Varies 8¼" D. at bow to 5¾" at stern	Varies from 10" D. at bow to 6¼" at stern
9. Inflation System	Standard CO ₂ system (0.50 pound charge) provides approximately 1.5 psi gas pressure at 70°F.	Provides approximately 0.75 psi gas pressure at 70°F.
10. Sea Anchor	Conventional	Conventional
11. Materials	Buoyancy Tubes 5.0 oz. neoprene-coated nylon Floor 5.0 oz. neoprene-coated nylon Canopy 2.3 oz. polyurethane-coated nylon	11.2 oz. 2 ply, rubber-coated cotton 7 oz. rubber-coated nylon 3 oz. rubber-coated nylon

NOTES: (1) A system to permit bail-out of water after canopy closure is being developed.

(2) A larger sea anchor, semi-hemispherical shape, is proposed if future tests indicate need for reduced rate of drift.

FLIGHT PHYSIOLOGY NOTES

TO BE OR NOT TO BE AWARE—ALERT—ALIVE

Aviation Physiology Training Unit, US NAS North Island, Jan 8, 1965.

Consciousness is generally defined as an awareness, especially of something within oneself; state or fact of being conscious in regard to something; the upper level of mental life. Medically it is defined as the responsiveness of the mind to the impressions made by the senses or the critical reactivity of the mind to events in the environment.

Most of us are apt to take consciousness for granted, but actually of all the physiological processes it is in many respects the most tenuous since it may have many levels or states, which on their fringes blend imperceptively with one another. Pre-occupation, fatigue, apprehension, pain, temperature, "G" forces, hypoxia, etc; in fact there are few if any "internal" or "external" factors which can not either independently or in consort influence what might be termed "functional consciousness."

Functional consciousness may be defined as that part of the whole consciousness that is necessary for optimal performance of a given function or task and will vary directly with the complexity and/or sophistication of the function. The availability of a given functional consciousness will in turn be dependent upon the level of whole consciousness and on the auxiliary demands then placed on this level.

For example if we assign the figure of 100 to the whole consciousness and if the optimal functional consciousness for driving a car is 75 a reserve consciousness of 25 is available. If then the car radio is turned on and quiet music (not the Beatles) is listened to, this auxiliary demand will drain off an additional 15 leaving a reserve consciousness of 10. If on the other hand the car radio is turned on to an exciting football game this auxiliary demand might well drain off 40 thereby using up all of the reserve consciousness level to below the optimum. It also follows that any decrease in whole consciousness could, and nearly always does, adversely affect functional consciousness since reserve consciousness would be lessened and any auxiliary drain would most likely result in a reduced functional consciousness.

The over-all concept of the various states of consciousness is only of passing interest to man in his everyday life since he equates only consciousness and

unconsciousness. Admittedly, even in everyday life an unexplained period of time out of one's consciousness can be rather perplexing, if not a shaking event, but it assumes monumental proportions if it occurs while in control of an aircraft.

Since the very nature of the profession of flying exposes one to biophysical conditions which increases the potential for dramatic changes in the whole and in functional levels of consciousness it is worthwhile to examine a few of the factors.

That hypoxia can cause a lowering of the level of consciousness is axiomatic. Brain tissue, of all of the tissues that make up the body, is singularly the most sensitive to a decrease in oxygen availability. The normal blood flow required by the functioning brain is ten times that of the remainder of the body on a weight for weight basis and the normal "oxygen debt" of the brain only suffices for approximately six seconds. It is therefore apparent that the delivery of an adequate amount of oxygen and its continuous utilization at the tissue level is a fundamental parameter of brain function.

The resulting lowering of the level of consciousness that results from a reduction of oxygen availability to brain tissue as described by the signs and symptoms of hypoxia are well known to those in aviation. But just as a reminder it might be well to quote in part from G. Tissander's dramatic description of balloon ascent to 25,000 ft. in 1875 which proved fatal to both of his companions.

"But soon I was keeping absolutely motionless, without suspicion that perhaps I had lost use of my movements. Toward 7,500m. (24,606 ft.) the numbness one experiences is extraordinary. The body and the mind weaken little by little, gradually, unconsciously, without one's knowledge. One does not suffer at all; on the contrary, one experiences inner joy, as if it were an effect of the inundating flood of light. One becomes indifferent; one no longer thinks of the perilous situation; one rises and is happy to rise. Vertigo of lofty regions is not a vain word. But as far as I can judge, this vertigo appears at the last moment. It immediately precedes annihilation, sudden unexpected, irresistible."

Hypoxia can indirectly play a role in relation to consciousness by producing a sense of air hunger with an associated response of an increase in rate and depth of respiration. This varying degree of hyperventilation is an attempt by the body to compensate for the hypoxia by increasing the lungs effec-

tiveness and thereby the amount of oxygen carried by the blood. In mild conditions of hypoxia this compensating system is fairly effective unfortunately this procedure is in part negated by the fact that hyperventilation also reduces the carbon dioxide level of the body, which in turn may interfere with the ability of the tissues to utilize the oxygen. A final comment regarding hypoxia is the paradoxical response, a slowing of the pulse, fall in blood pressure and inhibition of respiration. The prevention of hypoxia by a thorough understanding of the problem and of the systems used in aviation to protect against hypoxia, is in the final analysis, the best means to avoid its pitfalls.

The other chemical substrate on which the brain is dependent for optimal function is blood sugar. There is abundant evidence that whole consciousness and functional consciousness of an individual varies directly with the blood sugar level. It has been reported that six out of nine aircraft incidents and/or accidents occurred some hours after the last meal, either late morning or late afternoon and that it is common to find in these cases, a history of missed or deficient meals. Inadequate diet, and its effect of lowering blood sugar levels, produces significant increases in neuromuscular tremor, irritability, reaction time, sweating and confusion coupled with diminished maximum work output and a general lowering of whole consciousness. This lowering of whole consciousness and increased auxiliary drains (tremor, sweating, confusion) significantly compromises functional consciousness.

Hyperventilation per se is another factor which can occur during flight and which is a potent influence on consciousness. Its effect on consciousness is mediated through its influence on the blood flow to the brain and through its effect of shifting the blood acid-base balance to the alkaline side, which in turn interferes with the red blood cells effectiveness in delivering their oxygen to the brain cells. The reduction of blood flow to the brain due to hyperventilation involves two mechanisms, vasoconstriction of the cerebral vessels and the concurrent vasodilation and increased pooling of blood in the muscles. The effect of this combination can, either/or; dramatically lower the level of whole consciousness; produce unconsciousness; lower functional consciousness by increased susceptibility to side drain-off factors such as apprehension, tremor, etc.

Positive pressure breathing affects blood flow to the brain and therefore consciousness by its effect of damming back of blood in the chest and thus decreasing the filling pressure of the heart.

It is well known that strong positive G can produce profound alterations in the blood flow to the brain, but it should be noted that relatively small increases in positive G can likewise produce profound alterations when coupled with other mechanisms that act similarly.

These and a whole host of other factors such as vertigo, hangover, worry, personal equipment, cockpit contamination, etc. can, either independently or in consort influence the whole or functional levels of consciousness.

Be conscious of these factors and do not let them gang up on you to produce permanent unconsciousness.

MK5/5A ANTI IMMERSION SUITS

There has been some confusion as to whether or not the inner liner should be worn and if waffle weave underwear can be substituted for the inner liner. The answer is that the inner "insulation-ventilation" liner must be worn in order for the MK5/5A Anti immersion *assembly* to be effective. It is this inner garment that provides the thermal barrier and the ventilation system to the suit. The waffle weave underwear is not a satisfactory substitute since it does not provide an adequate thermal barrier nor a ventilation distributing system. BUWEPS clothing and Survival Equipment Bulletin No. 60-61 states in part "To receive full benefit of its (MK5/5A) design it is important that personnel wear the MK5/5A coverall assembly exactly as described here-in."

The old MK5 used the Z-4 Anti-G suit listed in the section "H" allowance, this has a screw type fitting that mated with the round port of the MK5 suit. The MK5A has a square port and is compatible with the MK-2A or the full pressure suit MK-2 Anti-G suit. This MK-2A Anti-G suit will eventually be the only anti-G suit in the system and will be used with the full pressure suit, MK5A Anti-exposure suit and the summer flight suit.

The following are some stock numbers that might be helpful: MK-5A Anti-Exposure Suit Stock # of part:

Wrist seal:	Small: RM 8475-226-5703-IF50
	Medium: RM 8475-226-5703-IF50
	Large: RM 8475-226-5703-IF50
MK-ZA Anti-G Suit:	Large long: RD 8475-964-2713-IF50
	Large short: RD 8475-964-2714-IF50
	Small long: RD 8475-964-2715-IF50
	Small short: RD 8475-964-2712-IF50
Airport for MK-ZA (Green):	RM 8475-019-3884-IF50
Airport for Vent Garment (Red):	RM 8475-686-1737-IF50
Adapter for MK-ZA Anti-G	RM 8475-016-4522-IF50
Cover plate for Airport:	RM 8475-019-3885-IF50
Socks for MK-5A:	Medium: RM 8475-862-3340-IF50
	Large: RM 8475-862-8262-IF50
Neck seal for MK-5A:	RM 8475-027-0261-IF50
Gloves, Anti-Exposure insulated:	Size 8: RM 8475-862-3337-IF50
	Size 9: RM 8475-862-3338-IF50
	Size 10: RM 8475-862-3339-IF50
Tape, Rubber 1/8" Type 3:	RM 9320-045-8113-L980
Tape, Coated cloth, 1" Type 3:	RM 9320-078-8624-L980
Cloth, Rubber Coated Stretch Nylon, 50" Type 1:	RM 9320-045-8112-L980
Adapter for MK-5 Liner for MK-5A Outer Suit:	ACEL 64A102C1

F111-B (TFX) ESCAPE AND SURVIVAL SYSTEM

For the first time in operational aircraft, the escape system will be an integral part of the cockpit, a cockpit pod. This is the description of the emergency escape system for the Navy's F111-B (TFX).

Currently, emergency escape from military aircraft is usually accomplished by "over-the-side" bailout or by use of an ejection seat. Wind blast, tumbling, flailing, contact with aircraft structures, entanglement with parachute lines, low temperature, high surface winds, inability to release the personnel parachute, inability to climb aboard a life raft, and loss of survival gear have been factors exacting a high toll in personal injuries and loss of life. The fifteenth F111-B scheduled for delivery to the Navy in early 1966 will have the first Escape Pod. Earlier aircraft deliveries will incorporate a conventional ejection seat escape; however, the first fourteen aircraft will be fabricated in a manner to permit retrofit of the pod system. The functional design and scheduled performance of the pod system are such to preclude the crew members from exposure to the

previously mentioned hazards in the event escape from the aircraft is required.

When the escape sequence of the new system is initiated, the cockpit section is severed instantaneously from the aircraft. The metal skin and other structures are instantly cut just fore and aft of the cockpit bulkheads. If required, the cockpit segment will remain pressurized just as if it were still a part of the aircraft. Subsequent to cutting, a rocket motor will lift the cockpit section to an altitude compatible with parachute deployment. The system is designed to function under conditions of zero speed and zero altitude. The pod thus formed will lower the airman to earth and will remain a survival vehicle for a touchdown on land or as a boat for landing at sea. All emergency and survival items are carefully stowed in the pod and within easy reach.

To make possible this newly designed escape system, the single, most important technical breakthrough was the Navy-pioneered flexible, linear-shaped charge (FLSC) and mild detonating cord (MDC). The FLSC is a V-shaped, high-explosive, encased in a lead sheath. The Shape Charge is ap-

proximately 1/8 inch in thickness and is attached to the aircraft structure by means of a fiberglass shield. Between the Shape Charge and the shield, a high temperature foam is packed to provide ignition under all conditions, even under water. The V-shaped case directs the blast out the open side of the "V" as a cutting wave. It cuts smoothly and extremely rapid, so fast in fact, that the entire cockpit section is cut from the remaining fuselage in less than ten milliseconds. These pyrotechnic devices are percussion-actuated, and are insensitive to radar, high voltage, and radio frequency.

Even at sea level and zero speed, the pod is separated to an altitude that will provide 175 foot descent at a rate of 30 feet per second after the deployment of a 70 foot diameter parachute. In the event that the ejection materializes above 15,000 feet, a barostat delays the parachute opening until a 15,000 foot altitude is reached. Impact bags stowed in the pod are automatically deployed and inflated below the pod center of gravity. These collapse at touchdown, and thus attenuate some energy. Special flotation and self-righting bags can be deployed manually or automatically to provide buoyancy in the event there are leaks in the normally air-tight pod which have resulted from combat damage.

Optimum utilization of the escape pod concept will reduce the weight and bulk of the personally

worn survival equipment to that of an anti-g suit, gloves, protective helmet, and the back-up oxygen mask. The lightly clad crewman in the pod is a far cry from the currently worn exposure suit, Mae West, flashlight, flares, radio, shark chaser, parachute, sea survival kit, 38-caliber pistol, and bulky full pressure suit. For the first time, the crew will be able to concentrate on its mission under conditions of maximum comfort and efficiency. No longer will there be a necessity, self-consciously or otherwise, to be concerned with such details associated with emergency escape as "position, jettison canopy if time permits, pull face curtain, close exposure suit, concern with cold water, release of parachute risers, climbing to a life raft." All of the escape sequences and requirements will be automatically sequenced once the emergency sequence has been initiated.

The Bureau of Medicine and Surgery has been a prime consultant through its areomedical liaison in the establishment of this improved egress system. At the request of the Bureau of Medicine and Surgery, the Commanding Officer and Director of the Naval Training Device Center is engaged in a pilot study which will result in the production of a capsular training device. This device will be placed at selected air stations and operated by the Aviation Physiology Training Units prior to Fleet introduction of the F111-B.

—Aviation Medicine Sec, BUMED

MISCELLANY

LCDR TOBER NAMED FIRST RECIPIENT OF APHA MILITARY SECTION LITERARY AWARD

LCDR Theodore W. Tober, a pharmacist on the staff of the U.S. Naval Hospital, Portsmouth, Va. has been named first recipient of the recently established American Pharmaceutical Association Military Section Literary Award.

The award, consisting of a \$500 honorarium and plaque, will be presented at the first luncheon session of the Military Section on March 29, during the APhA annual meeting in Detroit.

The 1965 award, made possible by a grant from Eli Lilly and Company, is for Commander Tober's paper "Applications of Data Processing to Hospital

Pharmacy," published in the March, 1964, *American Journal of Hospital Pharmacy*. The paper was written by Commander Tober when he was serving as Chief of Pharmacy Service, U.S. Naval Hospital, Naval Air Station, Jacksonville, Fla.

The Military Section Literary Award Selection Committee consists of John M. Gooch, Chairman; Mrs. Gloria Francke; Grover C. Bowles, Jr.; W. Paul Briggs and Noel Foss. The award is presented annually in recognition of the best original contribution to the pharmaceutical literature during the calendar year preceding the annual meeting of the Military Section by a member of APhA employed by the federal government. Publications must have a significant relation to pharmaceutical practice, education, administration, pharmaceutical research,

pharmaceutical law or legislation, or professional regulation as it is related to the federal government.

—From: APhA News, February 10, 1965.

CAUTIONS REGARDING THE USE OF POTASSIUM CHLORIDE IN ENTERIC COATED TABLETS

Required changes in labeling of thiazide diuretics and thiazide diuretics in combination with enteric-coated potassium chloride will soon be announced, said Commissioner George P. Larrick, Food and Drug Administration, Department of Health, Education, and Welfare.

Commissioner Larrick also said that *enteric-coated potassium tablets (FSN 6505-299-8761)* will be restricted to the prescription list. He said the actions will be based on data from an extensive clinical survey and laboratory studies on animals reported to FDA January 6, 1965. These data, he said, were published in the February 22 issue of the *Journal of the American Medical Association*. They indicate a relationship between localized high concentration of potassium and ulcerative-obstructive lesions of the small intestine, although the incidence is low and a casual relationship in man has not conclusively been established.

FDA Medical Director, Joseph F. Sadusk, Jr., M. D., said that the thiazide products are often used to reduce edema. Because *thiazide diuretics* sometimes cause a depletion of potassium in patients, physicians administering thiazide alone, he said, often supplement it with potassium tablets. *Thiazide-potassium* products, he added, contain potassium for the same reason.

Dr. Sadusk said the revised labeling will recommend that physicians resort to natural food sources of potassium when possible to replenish the loss caused by thiazide diuretics. He added that coated potassium tablets should be used only when adequate dietary supplementation is not practical. He explained that potassium in foods disseminates throughout the intestine whereas a potassium tablet may settle in one place before dissolving and, being in high concentration, could cause a lesion.

Dr. Sadusk said the new labeling will point out that these small bowel lesions have caused obstruction, hemorrhage and perforation. The treatment is usually surgical. Some deaths have been reported. The labeling will warn physicians to administer coated potassium containing products only when indicated and that they should be discontinued should

abdominal pain, distention, nausea or gastrointestinal bleeding occur.

FDA said that following publication of two previous reports in the medical literature which linked the thiazide-potassium diuretics to ulcers of the small intestine, the Agency on November 17, 1964, held a conference with the two major manufacturers of these products—Ciba Pharmaceutical Company and Merck, Sharp & Dohme. The two firms offered to expand a hospital survey of patients already in progress to find cases of such ulcers and to see if they are related to the use of thiazide-potassium diuretics or to supplemental coated potassium tablets. The survey to date has covered 440 selected hospitals in the United States, Canada, South America, Europe, Africa, Australia and New Zealand. In addition, some cases have been reported directly to FDA.

Relabeling of thiazide and of thiazide-potassium combinations to be announced in detail shortly will have industry-wide application, Dr. Sadusk said.

—DHEW, Food and Drug Administration,
Feb. 19, 1965.

ISOMETRIC EXERCISES FOR THE UPPER-EXTREMITY STUMP

CDR Marion D. Bates, MSC USN and LCDR Joseph C. Honet, MC USNR.*

The importance of exercises designed to strengthen the stumps of amputees is well known. Many such programs have been proposed.¹⁻³ This report presents a method of strengthening the stump musculature in upper-extremity amputees, utilizing an isometric exercise technique.

The only equipment used is an aluminum elevated platform with a foam rubber leatherette upholstered cover, 13 x 7 x 3 inches, commercially called a quadriceps rest. Other similar devices may be substituted, such as a modified foot stool or canvas-covered sandbags. The exercises are performed on a firm surface, e.g., floor mat, padded plinth, or carpeted floor. Each exercise is performed ten times at least twice daily. Every muscular contraction is held for five seconds and followed by five seconds of complete relaxation.

The positions used for muscular strengthening are adapted from Daniels, Williams, and Worthingham.⁴ The exercises may be adapted for the shoulder abductor, flexor, extensor, rotator, and horizontal abductor and adductor muscles.

* Commander Bates is Chief Physical Therapist, Physical Medicine Service, U.S. Naval Hospital, Oakland, California. Lieutenant Commander Honet is Chief, Physical Medicine Service, U.S. Naval Hospital, Oakland, California.

This method of strengthening the musculature of upper-extremity amputees by means of isometric exercises has several apparent advantages. The exercises can be performed easily and simply with a minimum of equipment. Supervision can be provided for several patients at one time, if necessary. The exercises can be learned readily by the patient and then can be performed independently at home. It should be stressed that initial instruction with adequate supervision is necessary before releasing the patient for home therapy, and periodic rechecks under supervision are advisable.

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3. Eisert, Otto, and Tester, O. W.: Dynamic Exercises for Lower Extremity Amputees, *Arch. Phys. Med.*, 35: 695-704, November 1954.
4. Daniels, Lucille; Williams, Marian; and Worthingham, Catherine: Muscle Testing Techniques of Manual Examination, 2nd Edition, Philadelphia, W. B. Saunders Company, 1956, p. 176.

A STUDY OF ALCOHOLICS

Alcoholics, particularly those with the most severe forms of the disease, are increasing among State mental hospital admissions, according to Dr. Stanley F. Yolles, Director of the National Institute of Mental Health.

A study by the Institute's Office of Biometry, Public Health Service, U.S. Department of Health, Education, and Welfare, reveals that one in seven newly admitted patients is an alcoholic, an 18 percent rise in 10 years. In 9 States, disorders associated with alcoholism lead all other diagnoses in mental hospital admissions.

Recent figures analyzed by Ben Z. Locke, NIMH statistician, show a startling rise in the number of alcoholics diagnosed with "chronic brain syndrome associated with alcoholism," the most severe and hopeless of the 3 classifications of the disease. Patients in this group suffer permanent and irreversible destruction of the tissues of the brain. The damage probably results from metabolic or nutritional defects caused by prolonged use of alcohol.

These alcoholics undergo severe personality changes, delirium, confusion, amnesia, confabulation, or talkativeness about things that never happened, inflammation of the nerves, and pain in the arms and legs. The brain damage may be diagnosed by the electroencephalogram.

More than half the alcoholics now in State mental hospitals suffer from this irreversible form of alcoholism—a 50 percent increase in this group in the past 10 years. This rise occurred during a period when the number of patients in mental hospitals has

dropped. Patients in public mental hospitals in 1952 totaled 531,981 in contrast to approximately 495,000 today. Resident patient rates for these hospitals have dropped from 438 per 100,000 population in 1952 to about 359 per 100,000 now.

In contrast to the "chronic brain syndrome" patients, the other two classifications of alcoholics, "acute brain syndrome associated with alcoholism," and "sociopathic personality disturbance, alcoholism addiction," have grown at a much slower rate.

An analysis of one characteristic State, Ohio, furnishes this profile of the typical alcoholic admitted to a mental hospital: The odds are better than 4 to 1 that he will be a male, probably separated or divorced with little or no elementary education. He is most likely to be admitted to the hospital for the first time, in his forties.

The person least likely to become an alcoholic patient, according to these statistics, is the married female with some college education, either under 35 or over 54 years of age. Figures from other States show that the Ohio profile accurately represents the national picture.—DHEW, National Institute of Mental Health, March 4, 1965.

AMERICAN BOARD OF OBSTETRICS AND GYNECOLOGY

The next scheduled Part I (written) examination will be held at various examining centers in the United States, Canada, and military bases outside of the continental United States on Friday, July 2, 1965, at 10:00 A.M.

Applications received for the next Part II examination to be given in Chicago, Illinois in April of 1966 will be reviewed by the Credentials Committee in September and notifications will be mailed to candidates on or about October the first.

The 1965 Bulletin outlining current requirements should be available upon request about July the first. Application forms and Bulletins may be obtained by writing the Office of the Secretary. Applicants are urged to familiarize themselves with the current rules and regulations, particularly in view of the changes in application and examination schedules effective this year.

Diplomates of this Board are requested to keep the office of the Secretary informed of their current address.

Clyde L. Randall, M. D.
Secretary and Treasurer
American Board of Obstetrics and Gynecology
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